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ABSTRACT

This journal issue presents four major articles on cultural diversity issues in the education of gifted students. The first article is "An Alternative Approach to the Identification of Gifted Culturally and Linguistically Diverse Learners" by Carol S. Lidz and Sheila L. Macrine. It evaluates a dynamic assessment approach to identification of gifted culturally and linguistically diverse learners in first to fifth grades. Next is "Giftedness and Intelligence Assessment in a Third World Country: Constraints and Alternatives" by Patrick T. Sibaya and others. This paper describes use of the Learning Potential Assessment Device to identify gifted black students in South Africa. The third paper is "Teachers' Work: Institutional Isomorphism and Cultural Variation in the U.S., Germany, and Japan" by Gerald K. LeTendre and others. This study found core teaching practices and teacher beliefs show little national variation (although other aspects of teachers' work do) and demonstrate the impact of institutional isomorphism in schooling. Next is "The Learning Styles of High-Achieving and Creative Adolescents in Hungary" by Andrea Honigsfeld. This study found that high, average, and low academic achievers and students creative in various domains demonstrated significantly distinct learning style characteristics. The journal also includes reviews of two books: "International Handbook of Giftedness and Talent" (Second Edition) by Kurt A. Heller and others) and "The Academic Adventures of Laura Bridges: An Introduction to Educational Architecture Therapy" by James P. Bridges. (DB)

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Mensa, the high IQ society, provides a meeting of the minds for people who score in the top 2 percent on standardized IQ tests. As an international organization with thousands of members worldwide, Mensa seeks to identify and foster human intelligence; encourage research in the nature, characteristics and uses of intelligence; and provide a stimulating intellectual and social environment for its members.

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Associate Editor's Preface

You may thank Francis Estrand-Cartier, my son-in-law, for the cover art. This is his third *MRJ* cover.

If you've had the impression that most of the research on giftedness is being done in the United States, you're probably right. But that's not to say that nothing is being done in other countries. *Mensa Research Journal* has published articles from other countries from time to time though not as often as we'd like. Perhaps there is more going on elsewhere than we can readily find out about. If you have alternative sources, we urge you to let us know about them. The *MRJ's* major source is research submitted for the MERF Awards for Excellence in Research. This issue contains two such articles devoted to international and intercultural research regarding gifted students from countries not previously represented here: South Africa and Hungary.

The other articles are also concerned with gifted cultural and linguistically diverse learners.

Don't overlook the lists of references in all these articles.

It's interesting to note that, while cultural differences certainly exist, there are perhaps more similarities than differences among the experiences of gifted children. Recent events have made it frighteningly clear that there are cultures in which learning itself is countercultural. We even have some such subcultures here in the U.S.

Remember, all opinions expressed in *Mensa Research Journal* are those of the writers, not of MERF or Mensa.

Francis Cartier
Associate Editor

Notes, Quotes, and Anecdotes

• *Mensa Research Journal* has received an honorable mention in Association Trends' annual competition. Congratulations to MRJ Editor Phyllis Miller and Production Manager Annette Kovac! I wish I could show you the beautiful certificate itself. I can at least show you what it says.

2001 Excellence in Association Publications
In recognition of Achievement, Association Trends hereby salutes
American Mensa
for the quality and creativity evident in the preparation and production of
Mensa Research Journal
We commend this publication to the attention and admiration
of the entire association community.
Given January 30, 2002
By Association Trends
[signed]
Jill Martineau Cornish, President/Publisher

• The usual reminder: These comments are mine alone. Neither American Mensa nor the Mensa Education & Research Foundation have anything whatsoever to do with them. If you disagree or have anything to add for future columns, let me know. My email address, which reflects my assignment as chairman of the MERF Board's New Projects Committee, is newprojects@merf.us.mensa.org.

• For about 50 years, I have posted in my various offices a panel from a Pogo cartoon. The alligator and the rabbit, regular characters in Pogo, lounge on a tree root in the Okefenokee Swamp. The alligator says to the rabbit, "So much is prob'ly happenin' that we DON'T know about that what we know PALES into INSIGNIFICANCE." To which the rabbit calmly replies, "And even more."

I've just spent nearly a whole day searching the Internet with the words, "Talented youth." I'm impressed with the enormous resources available for gifted and talented kids. If you have a gifted offspring, I hardly know how to suggest where you might begin seeking advice and assistance. This column has cited a few sources before. Mind you, I haven't evaluated them deeply, but most seem to me to be legitimate and professional. There's considerable overlap of references in these websites, but each had something I hadn't run across before. Here are just a few of the hundreds I've located recently.

One is *www.rice.edu/armadillo/Rice/Resources/gifted.html.* That is Rice University's page on gifted education with click-it connections to lots of websites from the *Yahoo Directory on Gifted Youth*, which is also worth visiting.

Another is the Society for Children of High Intelligence, 5 Makepeace Ave., London N6 6EL, UK. CHI (apparently meant to be pronounced like Greek X)

has an on-line newsletter and various information and products. "Although based in the UK, all are welcome," says the website, www.chi-charity.org.uk.

Go to www.sengifted.org. SENG stands for Supporting Emotional Needs of the Gifted. SENG is at P.O. Box 6550, Scottsdale, Arizona. I don't know why I've never run across this organization before because it has obviously been around for quite a while. The 18th SENG conference was held in July 2001 in Irvine, California. "It is the mission of SENG to support bright, talented, gifted individuals and their families, and the professionals who work with them, to better understand the nature of giftedness, and to help these individuals reach their personal potential." SENG's website has a wealth of information as well as links to more than 20 related websites, several publishers, and other organizations.

The World Council for Gifted and Talented Children website is www.World Gifted.org. Take a look at it. See also www.giftedpsychologypress.com.

• Have I previously mentioned www.hoagiesgifted.org? It's extensive. Click on "Who Am I?" first, then plan to spend at least an hour in exploration of its many pages and cross-links.

Check out www.infoplease.com. It is encyclopedic. Call up "Intelligence," for example, and "psychological tests." You may already know everything there, but .... It also has interesting stuff for kids, bright or otherwise.

• Which brings me to one of my major frustrations about websites. Few of them include their Internet addresses on their websites. That is dumb! When I reach one by clicking on their cross-reference from another website and print it out because it interests me, I later have no easy way to contact them directly. If you have a website, for heaven's sake put your web address in it!

• The concept of "emotional intelligence" got off to a bad start with me a few years ago because some advocates of EQ were asserting that it was more important than IQ and I found the research evidence was sketchy at best. You may think differently so I'll mention an article by John D. Mayer, David R. Caruso and Peter Salovey, "Emotional intelligence meets traditional standards for an intelligence," in *Intelligence,* 27(4), pages 267-298. "Emotional intelligence," they say, "refers to an ability to recognize the meanings of emotions and their relationships, and to reason and problem-solve on the basis of them." The research reported here uses two tests of emotional intelligence (and some other tests) and claims to show that the concept qualifies as "an intelligence." I am perfectly willing to believe that getting along with other people is an important factor for success in life, especially in certain vocations and professions. I remain skeptical, though, about some of their proposed measurements of "emotional intelligence" and whether there is any need to label it "an intelligence."

• A better approach, I think, is that of Carroll Izard, et al, in "Emotion knowledge as a predictor of social behavior and academic competence in children at risk," *Psychological Science*, January 2001. This research, involving children from economically disadvantaged families, "measured emotion knowl-

edge with an emotion [recognition and labeling] task, both of which used cross-culturally validated [pictures of] facial expressions of interest, joy, surprise, sadness, anger, disgust, contempt, shame and fear." The research design and the results are a bit too complicated to do justice to here but "...suggest that consistent misperception or misinterpretation of emotion cues or frequent failure to perceive them at all could seriously impede the development of socioemotional competence." Furthermore, low ability to identify others' emotions from their facial expressions "degrades social communication and rapport" with both teachers and fellow students and can result in withdrawal and reduced academic competence.

• Dr. Sally Planalp prefers the term, "Emotional Competence." See her articles in *Communication Theory*, May 1999 and May 2000.

• I haven't yet read Howard Gardner's *Intelligence Reframed: Multiple intelligence in the 21st Century* (New York: Basic Books, 1999) but you might want to. His criticisms of most definitions and tests of IQ are thought provoking even if you can't fully agree with his proposed improvements. Earl Hunt, who reviewed the book in *Contemporary Psychology*, February 2001, agrees with Gardner on several points including that "emotional intelligence" is not a separable intelligence but has to do with "how certain skills are used, rather than whether or not a person can use them." He disagrees with Gardner, though, that current theories and tests of IQ, including the concept of *g* (general intelligence), are counter-productive. Hunt ends his review by saying that, while Gardner's Theory of Multiple Intelligences "does not provide a unique insight into improving educational practice. . . it is pretty good as a rhetorical argument to convince people that they ought to structure social settings to encourage the development of individual talent. Society can use such rhetoric."

• Is there such a thing as artificial intelligence? Not yet anyway, according to Leah A. Lievrouw of the Dept. of Information Studies & Communication Studies Program at UCLA, writing in *ICA Newsletter*, January 2001. ICA is the International Communication Association.

> Critics (including AI researchers themselves) say that despite years of work computers remain incapable of even the simplest types of "learning" or general-purpose problem solving envisioned by the founders of the field.

For a basic history of AI, see Paul Edwards' *The Closed World: Computers and the Politics of Discourse in Cold War America* (Edwards, 1996). More recently, there have been significant spin-offs from AI research resulting in fairly good speech-recognition, etc., but certainly not speech comprehension, which is a vastly different problem. But hey, we humans aren't perfect at that.

• Dr. Robert J. Sternberg (a name familiar to *MRJ* readers) is now Director of the Yale Center for the Psychology of Abilities, Competencies, and Expertise (PACE Center). It is dedicated to the idea that the study of innate abilities and

of the development of competencies should not be separated but are best investigated together. A couple of the planned research projects at the PACE Center involve applications of Sternberg's Triarchic theory of intelligence, and training and development of practical job knowledge for military leaders. For more information, see www.yale.edu/pace.

• The American Psychological Association recently established the Center for Gifted Education Policy "to get psychologists and the public thinking about ...how to enhance achievement and performance of children and adolescents with special gifts and talents." Dr. Rena Subotnick has been appointed as director. "Some disciplines," says Dr. Subotnick, speaking of sports for example, "have highly developed structures for cultivating talent, but others take a more haphazard approach. I'd like to draw the attention of the latter group to how they can do it more consciously."

• *Extelligence* is a word coined by Jack Stewart and Ian Stewart at the University of Warwick, Coventry, England, in their 1997 book with the intriguing title, *Figments of Reality* (Cambridge Univ. Press). They have an article in *Nature*, 22 February 2001, titled "Where are the dolphins?" It's about the possibility of our finding extraterrestrial intelligence and is interesting if you, like me, are into that sort of thing.

> [T]he most important ingredient of sentient, technically competent aliens is not intelligence but...'extelligence.' This is the contextual analogue of individual intelligence. Humanity's assumption of global dominance is a tale of extelligence: Language, permanent archives of information such as books, and communication in all its technological forms. When compared with most forms of life, our intelligence is only marginally greater than that of chimpanzees: it is our extelligence that has driven our cultural growth and technology.

It's not a word I intend to incorporate immediately into my conversations, but just knowing it and that its concept exists might help unravel some of the many ambituities about human vs. animal intelligence.

• That reminded me of a quotation from Arthur C. Clarke's 1962 book (revised 1984), *Profiles of the Future* and, wonder of wonders, I quickly found it.

> Some millions of years ago, the most intelligent of the mammals withdrew from the battle of the dry land and withdrew to their ancestral home, the sea. They are still there, with brains larger and potentially more powerful than ours. But (as far as we know) they do not use them; the static environment of the sea makes little call upon intelligence. The porpoises and whales, who might have been our equals and perhaps our superiors had they remained on land, now race in simple-minded and innocent ecstasy beside the new sea-monsters carrying a hundred megatons of death. Perhaps they, not we, made the right choice; but it is too late to join them now.

• You do remember Clarke's First Law, don't you?

> When a distinguished but elderly scientist states that something is possible, he is almost certainly right. When he states that something is impossible, he is very probably wrong.

• The Spring 2001 issue of *The National Research Center on the Gifted and Talented Newsletter* had an article by Denise de Souza Fleith, "Suicide among gifted adolescents: How to prevent it." If your gifted teenager (or approaching teenage) has threatened suicide, has sudden changes in behavior or weight or energy level or motivation, sleeps much more than usual, has withdrawn from friends or activities, gives away treasured possessions, exhibits markedly increased irritability or rebellion, or engages in very risky behaviors, these may be signs of suicidal tendencies. I don't find the article's recommendations remarkably different from common sense and loving care. Having been a gifted child and raised a couple, I believe that some of these may be merely signs of adolescence. If the signs seem serious to you, though, they might well be. In that case, get professional help. You might also look at www.jasonfoundation .com, which is devoted to teen suicide. Then look at www.suicidology.org or www.spanusa.org. Of the five websites I've checked on this topic, these three seemed to me to be the most helpful.

• Smart vs. Wise. "Heavier recreational Internet use was shown to be highly correlated with impaired academic performance." That's one of the conclusions in a study of 572 college students by Robert W. Kubey, Michael J. Lavin and John R. Burrows in *Journal of Communication*, June 2001.

• "It is a profitable thing, if one is wise, to seem foolish." Aeschylus.

• Marylou Kelley Streznewski, *Gifted Grown Ups: The Mixed Blessings of Extraordinary Potential*, 288 pp., John Wiley & Sons, 1999, $24.95, is reviewed by Rena Subotnik in *Contemporary Psychology*, August 2001. Subotnik mixes praise with criticism in ways that I cannot do justice to here. Read the review or better, get the book, and make up your own mind.

• Can eating blueberries increase your brain power as has been claimed? Probably not, according to James Joseph, Ph.D., Chief of the Neuroscience Lab at the U.S. Department of Agriculture's Human Nutrition Research Center at Tufts University. But blueberries may be good for an aging brain. Dr. Joseph was interviewed in the *Tufts University Health & Nutrition Newsletter*, March 2001. He found that blueberries "might be able to help both the learning capacity and motor skills of aging rats." Free radicals in the body are made of unstable oxygen molecules that can put wear and tear on the brain. The more free radicals, the more stress and the more the brain is subject to aging. The high antioxidant capacity of the anthocyanins in blueberries might be able to help an aging brain stay younger longer. While blueberries might be best, you can also get your daily requirement of antioxidants from red peppers, tomatoes, boysenberries, or blueberries. The deeper the color, the more antioxidants. So, if you're a

senior citizen, should you eat more blueberries? I will; I like them. Have questions? Try emailing healthletter@tufts.edu, or check their website www.healthletter.tufts.edu.

• I think I just learned two new terms for talking about talent: emergenic inheritance and epigenetic growth from Dean Keith Simonton, "Talent development as a Multidimensional, Multiplicative, and Dynamic Process," *Current Directions in Psychological Research*, April 2001. Simonton criticizes earlier research that is based on a simple conception that a talent may result from inheritance of a single trait. He offers a two-part model. First, a particular talent may require simultaneous inheritance of several traits. Total lack of any one of those traits may preclude the development of that talent. "This configurational type of genetic inheritance has been called emergenic .... " Second, "Genetic traits ... must develop according to epigenetic trajectories (i.e., innate developmental pathways)." Each of the several inherited traits may have its own growth pattern. That pattern will determine when a talent may "kick in" as a person matures. Thus, different individuals may begin to exhibit the talent at different ages. Early detection may not always be possible. Nurture of the talent is also necessary, but you knew that already, didn't you?

• In *Contemporary Psychology*, Vol. 46, No. 4, 2001, Sally M. Reis reviews Reva C. Friedman and Bruce M. Shore (Eds.), *Talents Unfolding: Cognition and Development*, Washington, D.C.: American Psychological Association, 2000. 279 pp. $39.95. "I hope," says Reis, "that with this book, we can now move from [merely] defining who is most likely to be gifted ... to the essential questions of what our society can do to nurture and actively promote this process." There are chapters by some prominent researchers. Ries complains that some others are not represented but gives the book a fairly positive review anyway.

• Ambrose Bierce defined *mind* as "A mysterious form of matter secreted by the brain. Its chief activity consists in the endeavour to ascertain its own nature, the futility of the attempt being due to the fact that it has nothing but itself to know itself with."

• Those who find the article by Lidz and Macrine difficult reading should at least read the Discussion beginning on page 27.

• The editors of MRJ confess to occasional lapses in proofreading. However, some inconsistencies occur because we try to preserve editorial customs of the authors.

• From a fortune cookie: You are capable, competent, creative, careful. Prove it!

F.C.

An Alternative Approach to the Identification of Gifted Culturally and Linguistically Diverse Learners

The Contribution of Dynamic Assessment

by Carol S. Lidz[a] and Sheila L. Macrine[b]
[a]Touro College and [b]St. Joseph's University

This study explores the utility of an alternative approach that incorporates dynamic assessment in the identification of gifted culturally and linguistically diverse learners in first to fifth grades (approximate age ranges from six to eleven) in a school with a majority of culturally diverse students. From a total population of 473 students in a Pennsylvania (U.S.A) school, 60 percent of whom come from either immigrant or ethnic minority backgrounds, this study identified 25 (5 percent) who qualified for inclusion in the school district's special program for academically gifted students. The distribution of cultural backgrounds of the students who qualified for the classes for gifted students paralled the proportion of representation of students from these backgrounds in the school. Previously, the number of children identified from this school ranged between two to four students (< 1 percent). The total percentage of gifted children identified within the entire district within which this school is located is typically 5 percent and the number of children identified within this school by this study matches this proportion. The study demonstrates the contribution of dynamic assessment to the identification of gifted minority children. The study also offers evidence of construct and concurrent validity of the dynamic assessment procedure based on the Naglieri Nonverbal Ability Test.

Introduction

There is a consensus in the U.S. literature that students from minority backgrounds are disproportionately underrepresented among those selected for gifted programming (de la Cruz, 1996; Frasier et al., 1995a; Saccuzzo and Johnson, 1995; United States Department of Education, 1991). This underrepresentation characterizes students from a diversity of ethnic backgrounds.

Many reasons have been cited for this disparity, including claims of test bias and inappropriateness, negative teacher attitudes, lack of familiarity with minority cultures and deficit orientation (Florey and Tafoya, 1988; Frasier, 1997; Frasier et al., 1995a,b; Harris, 1993). Most scholars agree that alternative approaches to identification of minority children for gifted programs are necessary (Frasier and Passow, 1994; Hadaway and Marek-Schroer, 1992; Maker, 1996, Masten, 1985; Richert, 1985; Sisk,1987,1988). One of the complications

Reprinted from *School Psychology International*, 2001, Vol.22(1).

of identification of children from minority cultures in the U.S. is that minority background is often confounded with socio-economic status and, therefore, with educational level. Children who qualify as gifted tend to be Caucasian and from families with higher incomes and higher levels of education, (U.S. Department of Education, 1991). Children whose parents are educated and whose home experiences tend to be similar to their school experiences are relatively more successful in school. Poverty and racism take their toll, and children from minority backgrounds cannot be expected necessarily to manifest their giftedness in the same way as children from backgrounds more compatible with their classroom experiences. There are also cultural dissonances reflected in parental beliefs, expectations and definitions of giftedness that would be anticipated to relate to the behaviours and successes of children within their school programs. Such differences are reflected, for example, in attitudes towards competition and towards bringing attention to individual accomplishments. Nevertheless, reliance on traditional, standardized procedures remains the norm (Stephens and Karnes, 2000). Recognizing giftedness in children from culturally diverse backgrounds remains a challenging task.

There are a number of existing programs that have been developed within the U.S. to address these issues (e.g. Borland and Wright, 1994; Brooks, 1984; Karnes and Johnson, 1989). What is clear from existing studies and programs is that traditional methods will not suffice in identifying minority children (Richert, 1985). Alternative approaches are necessary, that is, alternatives to normed, standardized tests. Most prevalent among suggestions for alternatives are recommendations for use of multiple criteria for selection of candidates (Frasier, 1997; Frasier et al., 1995; Patton, 1997), inclusion of information from families regarding their ideas of giftedness (e.g. Bernal and Reyna, 1974; Gallegos and Flores, 1982; Harris, 1993; McClellan, 1985), consultation with community leaders (Davis, 1978), widening the base of information considered as gifted (Dabney, 1988; Hilliard, 1976; Patton, 1992; Shwedel and Stoneburner, 1983; Wright and Borland, 1993), inclusion of measures of creativity (Fox, 1981; Renzulli, 1978; Smutny and Blocksom, 1990), improvements to inservice training of teachers (Kofsky, 1992), intracultural peer referral (Harris, 1993; Cunningham et al., 1998), inclusion of new models such as portfolios (Wright and Borland, 1993) and dynamic assessment. Dynamic procedures differ considerably from traditional psychometric approaches, yet have been found promising and useful by a number of researchers (Bolig and Day, 1993; Day and Hall, 1987; Hickson and Skuy, 1990; Kanevsky and Rapagna, 1990; Kaniel and Reichenberg, 1990; Kay and Subotnik, 1994; Lewis, 1991; Passow and Frasier, 1996; Sisk, 1987; Stanley, 1995). Because of the difference of the dynamic approach from traditional procedures and the decision to investigate the usefulness of this approach in this study, further explanation and description is warranted.

Dynamic assessment

Dynamic assessment is an approach to test administration that typically proceeds in a pre-test-intervention-post-test format. The key feature of these procedures is that the assessor actively intervenes to help the learner understand the basic principles of task solution, and to proceed in a strategic, self-regulated style (Lidz, 1991). The focus of interpretation of dynamic assessment is on the student's ability to profit from the intervention embedded within the assessment. Thus, the post-intervention score is taken more seriously than the preintervention score.

The use of dynamic assessment with children from culturally diverse backgrounds is particularly promising, as suggested by Hickson and Skuy's (1990) findings that significantly more students obtained scores over the 90th percentile on the Ravens Matrices following the test-embedded intervention of their dynamic assessment than those who reached this level on the traditionally administered Ravens test. Skuy et al. (1988) demonstrated the promise of identifying gifted children from low socio-economic background with subtests of Feuerstein's dynamic assessment procedure.

Frasier and Passow (1994) described a 'new paradigm for identifying talent potential amongst culturally diverse populations' (p.63) that suggests that

> Traditional identification approaches can be improved by designing, adapting, modifying, and extending instruments, strategies, and procedures that take into account the influence of race, culture, caste, and socioeconomic status on behavior .... (pp. 63-66).

Kirschenbaum and Renzulli (1995) have also proposed the incorporation of dynamic assessment into teacher-administered screening procedures used to identify potentially gifted students. Likewise, Bolig and Day (1993) discussed the potential relevance of dynamic assessment for identifying a myriad of gifted learners from diverse backgrounds. Stanley (1995) applied dynamic assessment in his study and reported an increased number of candidates for gifted programming related to the use of dynamic assessment, and Borland and Wright (1994) have incorporated a dynamic assessment measure among their sources of identification of gifted students.

Dynamic assessment has shown particular promise for use with students from linguistically diverse backgrounds (e.g. Lidz, 1997; Lidz and Peña, 1996; Peña et al., 1992), where issues of discriminating language difference from language deficiency pervade. Studies such as those carried out by Sewell (1979) and Sewell and Severson (1974) support the relevance of dynamic assessment for use with students from ethnic minority backgrounds as well.

The current study

The current study was carried out in Pennsylvania, U.S.A, where the most recent guidelines for services to gifted students were approved in 1995. These guidelines support the use of multiple sources of data, but include an IQ of no lower than 130 among the criteria. Guidelines for determination of giftedness vary considerably among the states, and Pennsylvania is apparently the only state that specifies an IQ score (Stephens and Karnes, 2000). The guidelines allow exceptions for 'documented, observed, validated, and/or assessed evidence [of] intervening factors such as English as a second language'(pp. 11-14).

The study's district's procedures for selection of children for the gifted program rely heavily on traditional standardized testing and have resulted in identification of only a few students from the community's immigrant and minority groups. For example, the school whose students participated in this study has historically identified less than one percent of its over 400 grade 1 to grade 5 students as gifted. This school has the largest proportion of minority and immigrant students in the district. In contrast, the overall proportion of students identified as gifted throughout the district is five percent. Administrators from the district recognized their problem, and initiated the idea for this study with the authors.[1]

This study investigated the possibility of increasing the proportion of students from culturally and linguistically diverse backgrounds in the target school as gifted, with procedures that included dynamic assessment as an alternative approach to assessment. The study also explored the construct and concurrent validity of the dynamic assessment procedures used.

Method

Participants

The school in which this study took place is located in a suburban area in eastern Pennsylvania. The township in which the school participates enrolled 3356 elementary school students (grades 1 to 5) during the year of the study. The participating school enrolled 473 students in grades 1 to 5. In contrast to the total Township enrollment of 40 percent minority students, the school involved in this study enrolled approximately 54 percent minority students and an undetermined proportion of students from immigrant backgrounds, leading to estima-

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[1] Special recognition goes to District Superintendent James Watson; School Principal, Michael Misoda; Director of Special Education, Claudia Mahon; Guidance Counselor, Joseph Gabriel; President of the district's Association for the Development of Gifted Education, Lenore Kahn; and gifted teacher of the gifted program, June Davis, for their initiatives and cooperation with this project. The school staff and office personnel derserve special thanks as well for their tolerance and cooperation.

tion of culturally diverse students exceeding 60 percent. The students enrolled in the school come from African-American, Hispanic-American (mixed origins), Asian-American (Indian, Chinese, Cambodian), and East European immigrant backgrounds.

This study began with screening of the entire student population in first to fifth grades (N = 473). The kindergarten (average age range, five years) was not included because the district has chosen not to include children from this level in their gifted programs.

The children who performed within the top tenth percentile range on the measures administered (or who were among the top ten percent of the population, if there were no percentiles) qualified for individual assessment. Two students who would have qualified were not tested because the district's school psychologist had already determined their eligibility. The parents of two children refused to sign the permission, and two other children who qualified moved out of the district before they could be tested. This resulted in a total of 81 students who completed the individual assessment, or 17 percent of the total school population. All children were fluent English speakers, though many were bilingual and English was not necessarily their dominant language; however, the test selected for dynamic assessment, as well as a subscale of the more traditional measure, were both "nonverbal," to reflect the challenges of student bilingualism.

Procedure

Both authors, with the help of two graduate students[2] administered the screening procedures between the end of January and the middle of March of 1998. The authors selected screening procedures to reflect recommendations of researchers, of studies discussed in the introduction and to provide input into the identification process by all relevant parties, including teachers, parents and peers. Screening procedures included the following (copies of all nonpublished measures can be obtained from the first author):

- Gifted and Talented Evaluation Scales (GATES) (completed by teachers)
- Iowa Tests of Basic Skills (ITBS) (Reading and Math)
- Sociometric Questionnaire (completed by peers)
- Parent Questionnaire
- Group Dynamic Assessment Procedure (used for observation of classroom participation)

Finally, an attempt was made to conduct a group dynamic assessment to provide an opportunity to observe the students interacting in a classroom activity, but technical difficulties precluded the interpretation of this as a dynamic meas-

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[2] Special thanks to Katie Flynn and Heather Sterner for their participation in this project.

ure; nevertheless, the resulting scores are included as a measure of the student's participation in a classroom activity and observations by the teachers during the administration of this procedure contributed to selection of students for individual assessment.

Following completion of the screening, the authors reviewed the results and selected students who scored within the top tenth percentile on at least two screening measures. This resulted in a total of 85 children (18 percent of the students in grade levels 1 to 5) who were eligible for individual assessment.

Individual assessment occurred from the middle of March to October of 1998 (including the summer) The authors, both certified school psychologists with a number of years experience, were the assessors. Students were assessed in the order that their parents completed the permission forms. Assessment began with the higher grade levels and worked from completion of grades 3 to 5, followed by grades 1 and 2. The individual assessment included the following:

- Kaufman Assessment Battery for Children (K-ABC) (Mental Processing Composite, MPC)
- Naglieri Nonverbal Ability Test, modified for individual and dynamic administration (NNAT/DA)

The scores from the previous year's Reading and Math subtests of the Iowa Tests of Basic Skills (ITBS) were included in both the screening and the final determination of gifted diagnosis. For screening, students in the top tenth percentile qualified, and for final selection, students in the top third percentile qualified. That is, the scores of students who scored at or above these levels would count toward determining their eligibility for either individual assessment (90th percentile) or gifted program selection (97th percentile).

In an attempt to proceed as conservatively as possible, identification as gifted was defined as performance at or above the 97th percentile on any two of the three major instruments used, that is, the K-ABC (Mental Processing Composite, or Nonverbal), the NNAT (pre- or post-test), or the Math or Reading sections of the district's achievement test (ITBS). That is, the students had to obtain scores within the top three percent range across two measures, not within one measure. However, since the achievement data were not available for students in first and second grades, the criteria for these students relied on their performance on the two measures administered by the assessors (K-ABC and NNAT/DA), and the students had to perform at or above the 97 percentile on both.

Measures

GATES (Gilliam et al.,1996). This is a standardized, norm-referenced rating scale describing behaviours and characteristics of students between the ages of five and eighteen, intended for completion by teachers or parents. There are five

subscales that reflect the Federal definition of giftedness: intellectual ability, academic skills, creativity, leadership and artistic talent. Each subscale includes fifty items, rated from 1 (low) to 9 (high), grouped into categories of below average, average, and above average. The test was normed on students in 32 states and Canada who had been identified by their schools as gifted and talented. The mean of the test is 100, with a standard deviation of 15. Evidence is presented that supports the Scale's reliability and validity. The artistic talent subscale was omitted from the current study because this was not appropriate to the nature of the District's gifted program, which emphasized academics. The District offered other options for students with artistic or musical talent.

Sociometric Questionnaire. A sociometric scale was designed for this study.[3] Two items were included as 'distracters' to try to avoid positive or negative halo effect or response bias. The total score for this measure was the number of times each student was selected by other students on all but these distracter items. The content of the items reflects the literature describing the characteristics of gifted children (Frasier et al., 1995b, p.14). The purpose of the scale was to provide an opportunity for students to nominate their peers for consideration for inclusion in the gifted program. A criterion level of at least ten nominations was set for this study, based upon review of the distribution of the nominations.

Parent Questionnaire. The authors designed a parent questionnaire for this study to provide parents with an opportunity to nominate their children for consideration for inclusion in the gifted program. The guiding principles for the items included those that tapped important characteristics of academic giftedness, behaviours that were clearly observable to parents, as well as ease of completing the scale. These characteristics generally coincided with many of the 'core attributes of giftedness' identified across cultural groups by Frasier et al. (1995b, p.14). The total score on this measure reflected five points for each of the six 'gifted' items. Students whose parents rated them as gifted on at least four of the six items (20-30 points) were considered as 'identified as gifted' by their parents.

ITBS (Survey Battery) (Hoover et al., 1993). This is a well known, frequently used group achievement measure with a history of more than fifty years, developed at the University of Iowa (Drahozal, 1997). The ITBS has had a number of revisions that reflect the changing nature of curriculum and test purposes. The ITBS is the normed, standardized achievement test that is administered district-wide during the spring to students in grades 3 to 12. The Reading and Mathematics test scores were used for this study. Gifted students were included in the 1992 national standardization in the proportions of 3.4 percent (grade 3), 5.1 percent (grade 4) and 5.4 percent (grade 5), the grades to which the ITBS is administered by the school in this study. The ITBS was renormed in

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[3] Special thanks to Dr. G. Johnson of St. Joseph's University for consultation on this measure.

1995. Considerable reliability and validity information is available from the publisher. While a number of scores are available, for the purposes of this study, percentiles and developmental standard scores were the most appropriate, the former for purposes of selection criteria, the latter for purposes of statistical analyses.

Group Dynamic Assessment (Lidz and Greenberg, 1997; Lidz et al., 1997). In order to observe the students while engaged in a classroom activity, [we used] a group dynamic assessment that involved a modification of one of the Attention subtests of the Das/Naglieri Cognitive Assessment System. Teachers observed and rated the students' behaviour during the administration of this procedure by the authors and two graduate assistants.

K-ABC (Kaufman and Kaufman, 1983). Only the Mental Processing subtests of the K-ABC were used for this study because of the relative cultural fairness of these subtests and the possibility of deriving a nonverbal score from the results. This measure is appropriate for use with children between the ages 2 fi to 12 fi years. This is a normed, standardized procedure with mean set at 100 and standard deviation set at 15. The eight subtests appropriate for the ages of the students in this study were Hand Movements, Gestalt Closure, Number Recall, Triangles, Word Order, Matrix Analogies, Spatial Memory and Photo Series. The large number of studies in the manual are generally supportive of the measure's validity, although, subsequently, there have been challenges to the sequential/simultaneous interpretation (Conoley, 1990; Kamphaus, 1990), as well as regarding the degree to which the K-ABC expresses Luria's model (Das, 1984).

NNAT (Naglieri, 1997). This is an entirely nonverbal test, with all items in the format of matrices. The NNAT is normed and standardized and represents a revision and extension of the same author's Matrix Analogies Test. At the time of this study, the NNAT was available only as a group measure; it has since been redesigned for individual administration. For the purpose of this study, the group format was modified for individual administration, which involved placing the pages in a booklet for presentation to each student, devising scoring forms to enable the examiner to record responses, and asking the student to name or point to their selections, rather than record them in an answer booklet. The modification for individual administration involved no significant changes. The NNAT includes seven levels, designed for students in grades 3 to 12; each level has 38 items. Each student receives only the level appropriate for grade level. The items tap four possible areas of content: pattern completion, reasoning by analogy, spatial reasoning and spatial visualization. The proportion of coverage of these areas of content varies with grade level. Each page contains one matrix with five options. Students must select the option that best solves the problem of the matrix.

Index scores have a mean of 100 and standard deviation of 15. Because traditional test-retest information was not available for this measure and was need-

ed for the purpose of using the NNAT as a dynamic assessment measure, the test-retest information from the Matrix Analogies Test (its predecessor) was used. The intent was to subtract the test-retest figure from the student's post-test score (following intervention) as a correction for practice effect.

NNATIDA. The first author designed a dynamic assessment modification of the NNAT for this study. Dynamic assessment involves procedure administration in a test-intervene-post-test format. The NNAT form appropriate for each student's grade level was used for the pre-test and post-test for that student. In order to correct for possible practice effects related to readministration of the same form, the test-retest score from the Matrix Analogies Test[4] was subtracted from the post-test raw score before recalculating the standard score to obtain the final post-test score. The intervention was designed to be as conservative as possible, yet representative of meaningful mediation for the student. Following completion of the pre-test, the assessor provided mediation for the first five items that the student missed. The student was reassured that he had done a fine job, but that no one obtains a perfect score. They were then told that the items that they found difficult would be readministered. The mediation involved three steps as follows:

(1) The students were told what they had selected and that this first response was not correct. They were asked to look at it again to see if they could generate a better response. If the student then gave the correct response with no further prompting, they were granted a (1) or full score. Even in the case of a correct response, they were asked to defend their answer (why was that a good choice; what was wrong with their first choice . . .), and the assessor interacted with them to reinforce the correct basis for their selection.

(2) If the students did not give a correct response following step one, the assessor brought their attention to the details of the matrix, and said 'look at how this (pointing) relates to this, and how this (pointing) relates to this.' If the students then spontaneously selected the correct response, they were granted a score of 0.5 for that item.

(3) If the students did not give a correct response following step two, the assessor talked them through the solution of the item, and no further credit was assigned.

These three steps were followed for the first five items that the students did not correctly solve during the pre-test. The students were then asked to solve the remaining items that they had missed on their own, with no further intervention. Their post-test score was made up of the pre-test score, the scores they accumulated during the brief intervention (maximum of 5), plus any further successes (one point each) for the readministered items, minus the test-retest score. Both the pre-test and post-test scores were converted into standard scores, using the NNAT norms.

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[4] Includes test-retest correction for practice effect.

Results

Screening Measures

The screening identified 18 percent (N = 85) of the total population as eligible for individual assessment. An equal proportion of boys and girls passed the screening.

Teacher Identification. The teachers completed the GATES for all of the children in their classes. Using a score of 127 or higher (97th percentile) on any subscale of the GATES to indicate hits, false positives, and false negatives, the teachers correctly identified 20 percent of the students who later qualified as gifted, therefore failing to identify 80 percent. The teachers identified five students as gifted who did not qualify. Therefore, there were considerably more false negatives than false positives.

Parent Identification. The total return rate of questionnaires by the parents was 55 percent. This was fairly even across the grade levels Sixty percent of the parents of the children who passed the screening returned questionnaires (N = 48), which was somewhat higher than the total return rate. That is, it was only somewhat more likely for the parent of a higher functioning child to return the

Table 1

Logistic regressions predicting gifted classification from group assessments across immigrant group (N=79)

Step	Variable	R	Wald Statistic	*p*
1.	Immigrant	0.0000	0.5025	0.4784
2.	Gates I	0.2134	6.3164	0.0120
	Parent	0.0000	0.4488	0.5029
	Sociometry	0.0000	0.1481	0.7004
	Group DA	0.0000	0.3151	0.5745
3.	Gates I			
	*Immigrant	0.0000	0.2210	0.6383
Logistic Regressions with ITBS Scores (N=50)				
1.	Immigrant	0.0000	0.0248	0.8749
2.	ITBS Reading	0.0000	0.1620	0.6873
1.	Immigrant	0.0000	0.0248	0.8749
2.	ITBS Math	0.1869	4.0702	0.0436
3.	ITBS Math			
	*Immigrant	0.0000	0.2210	0.6383

*; controlled variable

Table 2

Logistic regressions predicting gifted classification from group assessments across minority groups (N=48)

Step	Variable	R	Wald Statistic	*p*
1.	Minority group	0.0000	0.8121	0.6663
2.	Gates I	0.2543	7.7423	0.0054
	Parent	0.0000	0.4468	0.5039
	Sociometry	0.0000	0.3903	0.5322
	Group DA	0.0000	0.2917	0.5891
3.	Gates I			
	*Minority group	0.0000	0.7327	0.3920
Logistic Regressions with ITBS Scores				
1.	Minority group	0.0000	3.2026	0.2160
2.	ITBS Reading	0.1580	3.3203	0.0684
1.	Minority group	0.0000	3.2026	0.2016
2.	ITBS Math	0.2142	4.4268	0.0354
3.	ITBS Math			
	*Minority group	0.0000	0.2011	0.6539

*; controlled variable

questionnaire. Among these, 15 (60 percent) of the parents whose children were identified as gifted returned questionnaires. The hit rate for these parents in correctly identifying their children as gifted was 50 percent; therefore, the false negative rate was 50 percent, distorted somewhat by the imperfect return rate. Thirteen children from the total population who were not identified as gifted by this project were identified as gifted by their parents.

Best Screening Predictors. Logistic regressions to determine which of the screening measures were the best predictors of gifted status for the total group appear in Tables 1 and 2.

In these analyses, it was necessary to separate ITBS scores from the scores of the other measures because the ITBS scores were available for considerably fewer students, and including them with the other scores in the regressions would have greatly reduced the power of these analyses (the ITBS tests are not administered until grade 3). The GATES Intelligence subtest was the only GATES measure included in the regression because inclusion of all the subtests, related to their very high intercorrelations, would have greatly reduced the power of this analysis; the Intelligence subtest was selected because it showed the strongest correlation with all of the other subtests. These tables show that

the scores from the GATES Intelligence subtest and the ITBS Math achievement subtest made the only significant predictions of final gifted status. These tables further document that neither minority nor immigrant status resulted in differential predictions of gifted status based on the GATES or ITBS scores.

Individual Assessments

Basis for Identification. The primary issue of this study concerned determination of the proportion of students identified as gifted within this school. There were 25 students who met the criteria of attainment of 97th percentile or higher on two of three parameters (K-ABC Mental Processing Composite or Nonverbal), ITBS Reading or Mathematics, NNAT pre- or post-tests. This represented five percent of the total school population, equalling the proportion of students identified as gifted by the district in which the school participates. The numbers of students identified per grade ranged from two (grades 2 and 3) to nine (grade 4); there were four in grade 1 and five in grade 5. Therefore, there were at least two students from each grade who qualified.

The categories of ethnic distribution of students who qualified for gifted placement approximated the proportions of the populations of the school. Therefore, the distribution was diverse, with 60 percent of the students who qualified as gifted coming from either ethnic minority or immigrant backgrounds.

Students qualified for identification as gifted based on their performance on three measures: the ITBS (Reading or Mathematics subscales), the K-ABC (Mental Processing Composite or Nonverbal subscales, with two exceptions made for students who scored exceptionally high on Sequencing in the context of other indications of high level functioning), and the NNAT (pre-test or post-test scores).

Of the 25 students identified as gifted, 23 met criterion on the basis of their performance on the post-test of the NNAT, that is, in response to dynamic assessment. Only five of these students met the gifted criterion on the pre-test of the NNAT. Ten of the students met criterion based on their achievement test scores, and, in all of these cases, their high scores were in the area of mathematics. Fourteen students met criterion on the basis of their K-ABC mental processing composite scores, and ten, on the basis of their K-ABC Nonverbal scores. Scores on the Nonverbal portion of the K-ABC made no special contribution for these students, as any student who obtained scores in the top three percent on the Nonverbal subtests met this criterion on the other K-ABC subscales as well.

Four of the students met the gifted criteria on all three components, that is, on the ITBS, the K-ABC and the NNAT. Twelve of the students met the criteria on the combination of K-ABC plus NNAT post-test. The rest of the students met the criteria on the basis of combinations including ITBS plus either the K-ABC or NNAT post-test.

Best Individual Predictors. Logistic regressions were used to analyse the relative contribution of the individually administered measures to the determination of gifted status. However, the ITBS contributions were calculated separately because of the reduced number of students for whom these scores were available. The ITBS scores from the previous year were included in both the screening and final selection phases; however, for screening, the criterion was set at the 90th percentile or above, and, for final selection, the criterion was set at the 97th percentile or above. Only the Mental Processing Composite (MPC) score of the KABC is included in the analysis because of the high intercorrelations among the subtests and the fact that all subscales are represented in this score. These results appear in Tables 3 and 4.

Table 3 shows that K-ABC MPC significantly predicts gifted status, controlling for immigrant group, NNAT pre-test and NNAT post-test. NNAT post-test significantly predicts gifted status, controlling for immigrant group, K-ABC MPC, and NNAT pre-test. ITBS Reading and Math each significantly predict gifted status controlling for immigrant group. None of the measures differentially predicts gifted status across immigrant groups.

Table 3

Logistic regressions predicting gifted classification from individual assessments across immigrant groups (N=79)

Step	Variable	R	Wald Statistic	*p*
1.	Immigrant	0.0000	0.5025	0.4784
2.	K-ABC MPC	0.1810	5.1076	0.0238
	NNAT Pre-test	0.0000	0.9691	0.3249
	NNAT Post-test	0.1883	5.3613	0.0206
	Group DA	0.0000	0.3151	0.5745
3.	K-ABC*Immigrant	0.0000	0.1039	0.7472
3.	NNat Post*Immigrant	0.0000	0.5217	0.4701
Logistic Regressions with ITBS Scores (N=67)				
1.	Immigrant	0.0000	1.3202	0.2506
2.	ITBS Reading	0.1934	4.9145	0.0262
3.	ITBS Reading *Immigrant	0.0000	1.8788	0.1705
1.	Immigrant	0.0000	1.3202	0.2506
2.	Iowa Math	0.1902	4.8428	0.0278
3.	Iowa Math *Immigrant	-0.0621	2.2820	0.1309

*; controlled variable

Table 4 shows that K-ABC MPC significantly predicts gifted status, controlling for minority group, NNAT pre-test, and NNAT post-test. NNAT post-test significantly predicts gifted status, controlling for minority group, K-ABC MPC, and NNAT pre-test. ITBS Reading and Math significantly predict gifted status, controlling for minority group. None of the measures differentially predict gifted status across the minority groups.

Validity of the Dynamic Assessment Procedure. An intervention segment was added to the NNAT to create a dynamic assessment measure for individual administration to the participants in this study. Analysis of pre-test to post-test gains for the 81 students selected for individual assessment yielded a change in mean scores from 104.48 (S.D. 20.26) to 118.46 (S.D.19.79), with a t of -15.66 and $p = < 0.000$. There was a highly significant increase in mean scores from pre-test to post-test on this measure. This explores a parameter of construct validity.

Evidence for concurrent validity of the NNAT/dynamic assessment was determined by means of correlation between the NNAT pre-test and post-test

Table 4

Logistic regressions predicting gifted classification from group assessments across minority groups (N=76)

Step	Variable	R	Wald Statistic	*p*
1.	Minority group	0.0000	0.8121	0.6663
2.	K-ABC MPC	0.1605	4.2876	0.0384
	NNAT Pre-test	0.0000	0.7109	0.3991
	NNAT Post-test	0.1648	4.4112	0.0357
3.	K-ABC MPC			
	*Minority group	0.0000	0.5349	0.4645
3.	NNAT Post-test			
	*Minority group	0.0000	0.8704	0.3508
Logistic Regressions with ITBS Scores (N=64)				
1.	Minority group	0.0000	1.6928	0.4290
2.	ITBS Reading	0.2255	5.6794	0.0170
3.	ITBS Reading			
	*Minority group	0.0000	0.7652	0.3817
1.	Minority group	0.0000	1.6928	0.4290
2.	ITBS Math	0.1956	4.7697	0.0290
3.	ITBS Math	0.0000	0.4139	0.5200
	*Minority group	0.0000	0.4139	0.5200

*; controlled variable

scores and the K-ABC MPC. These correlations were 0.64 (pre-test) and 0.74 (post-test), both significant at < 0.0001.

The relationship between the NNAT residual change score and all KABC subtests were significant ($p < 0.01$).

Practice Effect Correction for Dynamic Assessment. One attempt to correct for possible practice effect on the dynamic assessment (that is, the retest of the NNAT) was to subtract the estimated test-retest score from the post-test raw score before determining the standard score for each student. These scores were used for identification of the students for the gifted program.

In order to conduct a further check of the validity of the gains made by the students in response to the retest, the scores were checked against the standard error of measurement range information provided for simultaneous processing subtests of the Das-Naglieri/Cognitive Assessment System (1997a). These results appear in Table 5.

Table 5 shows that all but one set of gains (those made by students whose pre-test scores were between 81 to 90) were 80 percent or higher. That is, by far the majority of the gains made by the students following the intervention portion of the dynamic assessment exceeded the gains that might be expected from readministration of the test without intervention. Furthermore, the distribution of the gains across groups argues against regression to the mean, since a similar percentage of gains were obtained by students in all but the one level of pre-test score groups. Calculations were not made for the highest performers since they were at such a high level and maintained this level for the retest, without a sufficient ceiling to show gains out of an expected range; however, their scores did not regress. A total of 82 percent of the students obtained post-test scores

Table 5

Logistic regressions predicting gifted classification from group assessments across minority groups (N=76)*

Score Range	N Pre-	N Post-	M Pre-	M Post-	Expected Range	Percent Beyond Expected Range
70-80	5	0	74	NA	62-93	100
81-90	7	3	86	88	72-102	57
91-100	23	4	96	94	81-111	83
101-110	14	14	107	105	90-120	80
111-120	12	14	114	114	99-129	82
121-130	16	23	125	125	108-138	88
>130	3	22	136	142	not computed (ceiling scores)	

*from Das/Naglieri (1997) *Cognitive Assessment System Administration and Scoring Manual* for Simultaneous Scale (p. 290).

beyond expected gains. This information contributes to evidence for construct validity of the dynamic assessment procedure.

Discussion

This study investigated the effects of utilizing an approach to identification of culturally and linguistically diverse elementary school students that included dynamic assessment as part of a multi-source battery. This study identified 25 of the 473 students (i.e., 5 percent) in an eastern U.S. suburban school with almost two-thirds of its children from culturally or linguistically diverse backgrounds as eligible for the gifted program. Previous attempts to identify children in this school as eligible for gifted programming resulted in identification of fewer than one percent of the students as gifted. The proportion of students identified by this study matches the proportion of students in the entire district who have been identified as gifted. Furthermore, the 60 percent of minority/immigrant students among those who qualified reflects their proportion of representation within the school. The primary source of this successful identification was the dynamic assessment modification of the Naglieri Nonverbal Abilities Test; however, both the Kaufman Assessment Battery for Children, as well as the mathematics portion (and the Reading, for minority students) of the Iowa Tests of Basic Skills made significant contributions as well, but none of them beyond the NNAT/ DA.

Two screening measures showed significant relationships with final determination of giftedness. These were the GATES, completed by the teachers, and the ITBS Math achievement test scores.

Along with demonstrating the contribution of dynamic assessment to determination of eligibility for gifted programming, an important contribution of this study is that the procedures used, once the criteria were set, were not modified to accommodate students from minority or immigrant populations in any differential way. Once the criteria were set, they were applied to all students in the same way. Furthermore, the criteria were set conservatively, maintaining the high standards of performance at or above the 97th percentile on two of three types of measures. The assumption was made that giftedness exists in equal proportion among all populations, and the challenge was to find the procedures for identifying these characteristics among diverse populations that have been historically underrepresented. The procedures used in this study show considerable promise in meeting this challenge.

The possibility of differential performance of minority/immigrant versus nonminority/nonimmigrant students was explored, with no evidence found to support such a difference. However, interpretation of this finding is limited by the heterogeneity of the groups and limited resulting numbers of students once the groups were formed. Therefore, it can only be said that there is no support for the conclusion that students from minority or immigrant groups perform dif-

ferently from others on these measures (with the exception of the ITBS Reading scale).

One typical approach to addressing the disproportionate identification of minority and immigrant students has been to propose or select nonverbal measures (e.g. Swanson, 1995). However, this study, while showing that the nonverbal section of the K-ABC did make a significant contribution to the identification of the students, using this measure alone would have resulted in disproportionately low identification. Furthermore, the nonverbal score made no contribution beyond that of the Mental Processing Composite score. The pre-test of the NNAT alone would have identified even fewer students than the K-ABC Nonverbal scores. The suggestion is that merely changing the type of test is not enough to generate proportional identification of gifted and minority students. The success of the dynamic assessment modification of the NNAT supports the idea that it is the nature and format of test administration that is more potent in making the difference; that is, how the test is administered may be more important than what is administered. Dynamic assessment works with the child to assure understanding of the task, to provide additional time for reflective thought, to provide feedback regarding performance success and to provide exposure to the prerequisite strategies and problem solving skills. The ability to profit readily from these opportunities may be an important ingredient in identification of students from diverse backgrounds with high academic potential. The accumulated work of Carlson and Wiedl (summarized and reviewed in Carlson, 1989) supports the impression that one source of positive effects of dynamic assessment may be in influencing nonintellective factors such as anxiety, motivation and self-regulation. These effects may enhance the potential of this approach for crossing cultural boundaries or, at least, reducing the inhibiting effects of cultural and linguistic diversity. Interestingly, in this study, students from all backgrounds profited from these experiences equally, and the procedure was successful in finding the most promising students within all groups.

This study provided an opportunity to explore some validity issues with regard to dynamic assessment. The highly significant increase in pre-test to post-test scores on the NNAT following a very brief, conservative intervention, supports the effectiveness of the intervention in affecting the performance of the students. While there was no control group to rule out practice effect, the potential for practice effect was controlled within the procedure by the subtraction of the test-retest score. Also, the gains far exceeded those predicted for readministration of the procedure. This, then, is a form of construct validity.

Evidence of concurrent validity is available from the significant positive, moderate level correlations between the NNAT residual change scores and the K-ABC subtest scores, as well as from the significant and positive Pearson correlations between the NNAT pre-test and post-test scores and the K-ABC. While the correlation between NNAT pre-test and K-ABC accounts for one third of the variance of the K-ABC, the cor elation between the NNAT post-test and the

K-ABC accounts for about 50 percent of K-ABC variance. This shows significant overlap between two measures that claim to assess cognitive functioning; yet, the overlap is not so strong as to show that the procedures are nearly identical. The stronger relationship of the K-ABC with the post-test supports the concurrent validity of the dynamic assessment procedure.

This study does not address more basic issues of definitions of giftedness or of curriculum programming for gifted students. The primary concern of this study was to gain entry for students who are disproportionately excluded to a program, as it currently exists. Identification procedures are useful or relevant only in terms of the objectives of a particular program. In the current case, the program was academically focused and the nature of giftedness sought was academically oriented. Most of the children selected were academically successful (though not necessarily at a level comparable to their cognitive status).

Samuda et al. (1991) pointed out that 'The use of standardized tests can become discriminatory when results are viewed uncritically and are used to assess and place children from varied backgrounds into a school system originally designed for a fairly homogeneous group . . . Insisting on the continued use of conventional testing methods will only perpetuate this structural bias' (p.1). This study supports the optimistic view that alternatives exist and that unconventional application of existing standardized measures may hold one key to this promise.

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Giftedness and Intelligence, Assessment in a Third World Country: Constraints and Alternatives

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This paper considers two issues namely: the limitations of assessment procedures in current use with black clients and how these procedures can be adapted and used effectively through the dynamic approach. This article expounds upon the application of Learning Potential Assessment Device (LPAD) for the assessment of giftedness, intelligence and other cognitive abilities. The LPAD is based upon the Feuerstein's theory of structural cognitive modifiability.
In this paper the concepts "black client" and "minority group" are used interchangeably. In the present context, the concept "minority group" refers, in the narrowest sense, to black South Africans excluding Coloureds, Indians and Orientals. Minority group in the Republic of South Africa (RSA) implies a division between an "in-group" and an "outgroup". Whites in the RSA are a dominant culture group and have been used as the main base for generating terms of reference, criteria and the vocabulary of psychological assessment. Due to the limited number of black professional psychologists in this country, members of minority groups have also been assessed by members of the dominant culture group. Professionally trained black psychologists in the RSA have only recently joined professional ranks and they too are trained according to models relevant to the dominant group.
Broadly speaking, a member of a minority group could come from any group of people. In this sense a minority group comprises individuals who by virtue of their ethnicity, race, color, handicap, social and/or psychological attributes are in a subordinate position with regard to status and power.

The limitations of assessment procedures in current use with black clients.

In their professional activities, psychologists often encounter problems to providing services to minority group members. An important area for research is the question on how psychologists, conduct psychological assessment and therapy or measure intelligence and other cognitive abilities amongst minority group members. Many a psychologist, will despair and say "mea culpa, I break the rules," and resort to using informal assessment procedures with these clients. Doubts have been expressed about the effectiveness and relevance of many of these well established formal assessment techniques, especially when used with minority groups (Makunga, 1988; Boeyens, 1989; Taylor, 1992; Van den Berg, 1992).

Several factors limit the effectiveness of assessment of minority group members. In South Africa, this problem is exacerbated by the multi-cultural nature of

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our population. In this society, language is a confounding factor. Van den Berg (1992, p.3) asserts: "One is likely to encounter language communication problems in education and psychological testing in multi-cultural communities where more than one language is used." Holdstock (1981) maintains that South African psychology will only be relevant if we do not adhere exclusively to approaches that are western, but are aware that information on psychology can also be learned from the literature and scholarship of other cultures. There is very limited scientific literature on standardized psychological tests or instruments used with minority groups and, in particular, with black people in the RSA. The available information is limited to standardization sample reports contained in scholastic test manuals. There is a great shortage of information on this issue over the broad spectrum of testing and assessment in general.

In practice, psychological tests are useful tools in the process of psychological assessment. Behavior observation and qualitative analyses of test performance afford the tester an opportunity to move freely in the phenomenological world of the testee. Nowadays, psychologists are interested in how the client attains a score rather than how much score he/she earns. It is well recognized that the final score is the end product of complex cognitive processes, i.e., a shift from products of learning to the processes of learning. (Fischer, 1974; Stanley, 1993).

Psychological tests cannot answer all referral questions and cannot be a substitute for the full process of assessment (Maloney & Ward, 1976). Terms such as quantification and the global IQ are obsolescent because they exclude the EXPERIENCE of the individual as a source of data about his/her psychological make-up. Many psychologists (Fromm, Hartman & Marschak, 1957; McClelland, 1973; Fscher 1974: Fischer 1975) de-emphasize psychometric testing and instead emphasize psychological assessment. "Intelligence is not something which one has, but it is rather one's way of moving, or approaching..." situations and outcomes thereof (Fischer, 1974, p. 335). The current system of psychometric testing has severe limitations in providing for the assessment of social, educational, emotional and behavioral aspects of the client.

The suitability of such psychometric tests for the multi-cultural population of South Africa is dubious. From the psychometric point of view, the area of psychological assessment, particularly mental handicap or giftedness, is a veritable mine-field. Many techniques in current use, produce questionable results, in terms of basic psychometric adequacy (validity, reliability and standardization).

Method

The preceding conceptual framework details motivation for this article. It must be pointed out that the paper serves as a critical evaluative study of assessment procedures used with minority groups in the RSA.

Aims

The present investigation had the following aims:

i) an investigation of informal assessment procedures used by psychologists in various settings in the country.

ii) the development of a dynamic assessment procedure (DAP), which could help psychologists trained in the western approaches when assessing members of minority groups.

Assumption

The basic assumption of this study was that modes of assessment and psychotherapy used with white subjects will not be equally applicable in the assessment and treatment of minority group members in various settings.

Procedures

An open-ended questionnaire was mailed to psychologists. The contents of the questionnaire centered on the issues of psychological assessment and psychotherapeutic approaches with reference to minority groups. The questionnaire included items on assessment of intelligence and giftedness of minority group members, reporting an IQ score for a black client, personality assessment, aptitude testing and the assessment of other cognitive abilities. There were also questions on psychotherapeutic approaches. The respondents were also requested to furnish any other information relevant to assessment and therapy with minority groups.

There are several advantages inherent in the use of open-ended items. The respondent is given an opportunity to answer in his/her own terms and within his/her own frame of reference. As such, these items are effective in revealing the respondent's definition of the situation. Such questions encourage spontaneity, effective and thorough communication (Festinger & Katz, 1966; Herbert, 1990; Oppenheim, 1983).

Sample

The sampling frame used in this study consisted of a list of addresses of institutions. The questionnaire was mailed to twenty institutions. A request was made that the questionnaire should be circulated among colleagues who might be involved in assessment and psychotherapy with minority groups. The response rate was 80 percent. In 65 percent of these institutions, responses were received from more than one psychologist. The authors appreciated the respondents' effort as it is difficult to achieve a response rate of 100 percent with mailed questionnaires.

Data analysis

Open-ended questions in a qualitative study yield a large number of verbal responses. Data obtained in this way reflect real life experiences of psychologists and are therefore dependable. The first task was to classify these responses into meaningful categories. The specialized coding technique called content analysis was found suitable for this purpose. This involves a systematic analysis and description of the content of communications. Content analysis is an invaluable tool for use in clinical research as it provides a system for categorizing a wide range of responses to open-ended or unrestricted Items. It analyzes communications in a systematic, objective and quantitative manner (Eckhardt & Ermann, 1977; Herbert, 1990; Moser & Kalton, 1979).

Results

The content validity of the items was checked for common response patterns. There was consistency in the pattern of responses from psychologists working in various settings in the RSA. For purposes of analysis, it was considered that the frequency of response, from different respondents, indicates relative preference. These responses were rated on a six point scale. Five points were given to the response with the highest frequency, four points to the second, three points to the third and so on. This arbitrary assignment of weights served the objective of ranking the responses of psychologists in order of preference (See Table 1). The data were then converted to ordinal level of measurement in the last column of Table 1. This conversion was made so that the relative preference of various assessment or psychotherapy provided for could be determined. In Table 1 a rank order of one indicates that the mode of assessment or psychotherapy listed, receives the highest score for preference in use by psychologists when dealing with minority groups. A rank order of two, implies the second highest score on preference and so on, up to and including the least important ranking.

Contrary to the assumption proposed in the study, Table 1 reveals that standardized assessment procedures used with white subjects are quite important in the assessment of minority groups. Data in Table 1 also indicate that intelligence tests are the most often used and preferred procedure. This doesn't mean that these tests are suitable for intelligence testing and identification of the gifted among the minority groups. Psychologists prefer to use these tests because there are no standardized tests for minority groups. Decreased emphasis is placed on psychotherapeutic procedures, as well as personality tests, aptitude tests and interest inventories, suggesting that these latter tests are the least preferred procedures. On the basis of the survey, it appears that despite limitations of most psychological tests particularly when used with minority groups, practitioners find them useful. Their experience and comments are summarized in Tables 1-4.

Table 1

Personal preference of Western assessment psychotherapeutic procedures in use with minority groups

Assessment Psycho-therapeutic Procedures	Frequency of Response	Weighed Score	Rank Order
Intelligence tests	10	50	1
IQ Descriptive/Mathematical Model	9	36	2
Psychoterapeutic Procedures	8	24	3
Personality tests	4	8	4
Aptitude tests	3	3	5
Interest Inventory	2	0	6

The results of this study have two broad implications for clinical practice. First, a shift from the traditional model of psychodiagnosis and psychotherapy has not yet taken place. Second, the descriptive evaluative model of explaining a psychological construct is always preceded by a mathematical model, i.e., measurement then evaluation. The hypothetico-deductive psychological assessment approach has not yet made a dramatic gain in clinical practice. The significance of an integrationist approach is suggested by the fact that assessment and psychotherapy are ranked in the top positions.

Discussion

On the basis of the present findings, recommendations that will be made hereunder can benefit psychologists working with minority groups. Supporting evidence will also be drawn from the fund of personal experiences of the authors in their clinical practice.

In the light of the problems associated with current psychometric testing, it seems logical to explore the applicability of a dynamic assessment, using intelligence tests (Table 2). The Dynamic Assessment Procedure (DAP) follows the sequence of test-teach-test (T-T-T) paradigm or model. The use of dynamic assessment techniques with minority groups seems a viable proposition. In contrast to psychometric testing which is basically static, dynamic assessment has several tenets namely, modifiability of human attributes, emphasis on learning potential rather than IQ and emphasis on the process of assessment rather than the end product of assessment. In this approach, testing conditions stipulated in the test manual are modified to suit the individual testee. Table 2 indicates intelligence tests which can be used dynamically. Feuerstein's Learning Potential Assessment Device (LPAD) comprises a number of different instruments, most

Table 2

Intelligence testing procedures with minority groups

Intelligence Tests*	Age Group	All/Some Subjects	IQ: Mathematical/ Descriptive Model	General Remarks/Caution
Raven's S/C progressive matrix	Children & Adults	All	Both	No norms for RSA populations; consider testee's proficiency in English; use testee's mother tongue. Highly recommended for dynamic assessment.
Cattell's Culture-Fair	7 1/2-14 years & Adults	All	Both	Lanuguage not a barrier or use the testee's mother tongue.
Z-SAIS	Children & Adults	All	Both	Norms available for Zulu speaking subjects.
Draw-a-Person	5-15 years	All	Both	Administered in testee's language; useful in dynamic assessment..
WISC-R	Children	Some	Descriptive	Administered in testee's language; no norms for RSA populations.
WAIS (SA)	Adults	Some	Descriptive	As above.
OSAIS	3-15 years	Some	Descriptive	As above.

* Ordinal strength determined by the frequency of responses from psychologoists

Continued on next page

Table 2

Intelligence testing procedures with minority groups (continued)

Intelligence Tests	Age Group	All/Some Subjects	IQ: Mathematical/ Descriptive Model	General Remarks/Caution
JSAIS	Children	All	Both	No norms for blacks; non-verbal scale helpful in dynamic assessment.
SSAIS	5-17 years	Some	Both	Available norms for Afrikaans & English-speaking subjects; consider subjects' proficiency in language.
The Standford-Binet	2-14 years & Adults	Some	Descriptive	Useful in dynamic assessment; consider testee's mother tongue.
A Point of Scale of Performance; Grace Arthur, 1946	5 years to Adulthood	All	Both	Can be used with non-English speaking subjects.

Table 3

Tests of neurological disturbances used with minority groups

Test	Age Group	All/Some Subtests	Scores: Descriptive/ Mathematical Model	General Remarks
Bender Gestalt	5-12 years	All cards	Both	No norms for RSA; useful in picking up neurological deficits
QNST	Children & Adults	All items	Both	Nonverbal test, useful in picking up neurological deficits

of which are adaptations or derivations of well-known tests that are standardized and widely used (Skuy & Shmukler, 1987).

Dynamic assessment is an approach to the assessment of thought processes, perception, learning and problem solving. This approach involves measurement of initial levels of task performance, i.e., baseline behaviour. The second phase concerns mediated learning experiences, i.e., teaching or training the testee in areas where he/she is less competent. The aim of this procedure is task mastery and not merely recording of the testee's performance as a score, such as eight out of ten. The third phase is administration of a test which is similar in terms of difficulty level of items, to the one administered during the initial phase. The difference in performance between the initial phase and the third phase is used to estimate an index of learning potential. This index comes about as a function of mediated learning experience. When the testee independently solves analogous items to the third phase, a more difficult or transfer problem is presented. This is a significant departure from the procedure for most tests designed to date. The tester is not a passive observer of the testee's performance. The tester actively provides guidance and problem solving skills. With the advent of the new government in the RSA on 27 April 1994, the DAP could provide effective alternative assessment procedure in a multicultural society.

The LPAD is a dynamic approach to assessment and is based upon the theory of structural cognitive modifiability (Feuerstein, Rand, Hoffman, Hoffman & Miller, 1979; Feuerstein, 1980). The LPAD is inclined towards diagnosis of

Table 4

Personality tests for use with minority groups

Personality Test	Age Group in years	All/Some Subtests	Scores: Reported As A Mathematical Descriptive Model	General Remarks
TAT (Murray)	GB<14 years MW<14 years	4 sets of 20 cards: GBMW	Descriptive	A culture-fair test
TAT-Z	Adults above 16 years	10/18 cards	Both	Zulu, Sotho, Venda, Tawana, Tsonga. Western cards are not ethnically restrictive
Rorschach Inkblots	Recommended for adults	10 cards	Both	Popular responses culture & dialect bound
HFD	3-15 years	Three pictures	Both	A culture-fair test.
KFD	Children 6 years and above	Pictures of family members doing something.	Descriptive	A culture-fair test

deficiencies in cognitive processes that are potentially amenable to change (Boeyens, 1989). It has already been pointed out that many intelligence scales are available in this country (see Table 2) but have no norms for minority groups. Dynamic assessment procedures provide an alternative but different assessment procedure. Even the so-called culture-fair tests may not meet all the requirements of fairness. No two individuals have the same experiential worlds. "One persons fair is another's foul" (Taylor, 1992, p. 6). The problem of contextualization of items or subtests cannot be overcome easily. The story about the family going out for fishing and vocabulary related to fishing could be difficult for a person who is not familiar with this. While the dynamic assessment procedure aims at the identification of potential for improvement, it could, with benefit, also provide for contextualization of tasks.

Based on Feuerstein's theory, Shochet (1986) investigated learning potential at a tertiary education level. However, Shochet's study did not help to solve psychometric shortcomings. The LPAD has been extensively used in Israel and in

the RSA. Skuy, Gaydon, Hoffenberg and Fridjhon (1990) examined the predictors of performance of disadvantaged students in a gifted program. Skuy, Hoffenberg, Visser & Fridjhon (1990) examined temperament and cognitive modifiability of academically superior black adolescents. Skuy & Shmukler (1987) investigated the effectiveness of LPAD with Indian and Coloured adolescents. Literature on Feuerstein's LPAD and Instrumental Enrichment (FIE) is found in abundance (Skuy et al., 1988; Skuy et al., 1992; Skuy, 1987; Kaniel & Feuerstein, 1989; Rand et al., 1979; Shayer & Beasley, 1987).

A major problem with the T-T-T model is that it is time consuming and labour intensive (Boeyens,1989). The history of psychological testing and measurement reveals two corner-stones, namely inter-individual comparison and intra-individual analysis (Anastasi, 1982). The T-T-T model entails only intra-individual analysis. Any procedure that lacks standardization, lacks external validity. The mediated learning experience in this approach is a calculable process designed to improve the performance of low scoring groups (Boeyens, 1989). This practice leads to an injustice to the concept of potential. In clinical practice, the effect of rapport established between the therapist and the client may be overwhelming and can lead to a spurious assessment of potential. Psychometric tests are designed in such a way that they have ceiling levels. Subjects who experience no failure, reach this level earlier than those who are underachievers. The high scoring subjects do not need second and third test sessions. The T-T-T paradigm does not accommodate this phenomenon. The positive effect of mediated learning experience, i.e., teaching is confirmed by current studies (Boeyens, 1989). It is concluded that mediated learning experience taps the potential and makes testees extremely careful and meticulous in their problem solving. The advantages of using dynamic assessment procedure (DAP) outweigh its disadvantages. Drawing upon the fund of personal experiences and opinions of psychologists solicited by means of a survey, the authors have summarized the data shown in Table 2. Guidelines for use of these intelligence tests are suggested. Taylor (1992) proposes a battery of measures to optimize cross-cultural fairness in assessment. To provide a comprehensive picture of an individual's potential, this test battery must measure or assess the following main categories: fluid intelligence, automatization, transfer and information processing efficiency (Taylor, 1992). The present authors stress the significance of contextualization in any test construction.

Conclusion

We conclude this paper by pointing out that the tester should have good knowledge of cultural factors that can influence test behaviour. Among other factors to be considered are:

a. the cultural ecological history,
b. the theory of socio-individual behavior in the cultural context,

c. the person's degree of acculturation, and

d. the development of common psychological tests for measurement of intelligence and giftedness in the RSA.

As far as possible, tests should be administered in the language in which the client is proficient, preferably the mother tongue. This applies particularly to testees with a primary school level of education. In some instances, the assistance of an interpreter is solicited. An interpreter needs to be sensitive to the spoken and unspoken messages of the client. These messages must be accurately conveyed to the therapist.

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Teachers' Work: Institutional Isomorphism and Cultural Variation in the U.S., Germany, and Japan

by Gerald K. LeTendre, David P. Baker, Motoko Akiba, Brian Goesling, and Alex Wiseman

Policy debates in the U.S. are increasingly informed by use of internationally generated, comparative data. Many arguments revolve around whether or not such comparison makes "cultural sense" or whether specific educational activities that appear successful in one nation are "culturally appropriate" in another. These arguments clash with the work of anthropologists and sociologists who demonstrate that global cultural dynamics influence national patterns of schooling around the world. Using both the survey and case study data from the Third International Math-Science Study (TIMSS), we examine the working conditions and beliefs of teachers in Japan, Germany, and the U.S. in order to assess the relative merits of competing theoretical perspectives. We find some differences in how teachers' work is organized, but similarities in teachers' belief patterns. We find that core teaching practices and teacher beliefs show little national variation, but that other aspects of teachers' work (e.g., non-instructional duties) do show variation. We show that models of national cultures of learning or "national teaching scripts" may overemphasize cultural differences and underestimate the impact of institutional isomorphism in schooling. We argue that rather than change values, educational policy will be best served by identifying specific features of teacher work and analyzing how to improve these working conditions.

Over the past two decades, educational policy-makers and commentators have engaged in a lively debate about using cross-national studies of teachers' instructional practices to inform U.S. educational practice (Bennett, 1987; Berliner & Biddle, 1995; Bracey, 1997; Finn, 1992; Ravitch, 1986). Much of this debate focuses on comparisons between American and Asian cultural values about teaching and learning. This debate is organized around the question of whether or not cultural factors will permit superior educational practices used in other countries to be adapted for use in U.S. classrooms: "should be we be more like them or not?"

This seemingly straightforward debate is actually part of a long-term trend toward the internationalization of information used to inform American educational policy debates (see LeTendre & Baker, 1999; LeTendre, 1999a; Torney-Purta, 1987). This trend has intensified from *A Nation at Risk* through the internationally calibrated national objectives of *Education Goals 2000* to

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numerous recent comparisons between achievement of local American school districts and selected foreign nations (Baker, 2001). Whether they think "culture" prevents or makes attractive such comparisons, policy makers and commentators accept the idea advanced by researchers that East Asian cultural values strongly impact instructional practice, classroom management, teacher preparation, and textbook structure (Kinney, 1997-1998; Lewis & Tsuchida, 1998; Stevenson & Stigler, 1992; Stigler & Hiebert, 1998; Stigler & Stevenson, 1991).

Underlying all this use of cross-national information are two contrasting, yet often unspecified, theoretical assumptions about the precise way culture can be used as a foundation for cros-snational comparisons. Each of these views of culture holds different consequences for the way theory can be applied to international educational data, the way such data is used in formation of policy, and how future international studies should guide U.S. educational policy and reform. We begin this article with a description of the salient differences underlying the two dominant cultural perspectives (which we call the "national culture" and "global cultural dynamics" perspectives) and the consequences each perspective has for using cross-national comparisons to reform American education. Since the work of the teacher is central to so many aspects of educational reform, we then undertake several illustrative analyses of the instructional approaches of mathematics teachers and the organization of their work in the U.S., Germany, and Japan. These analyses are used to assess the ability of each perspective to explain cross-national patterns. We end with a discussion of the relative advantages of each approach and with suggestions for how to integrate these strong points into a more comprehensive perspective.

Cultural Images of Teaching and Cross-National Comparisons

National Cultures

The cultural argument most commonly used in debates about improving U.S. teaching practices casts cross-national differences as the product of distinct national cultures that are relatively stable across nations and homogenous within nations. Distinctive cultures are assumed to be more or less synonymous with nations. The underlying logic is that U.S., Japan, and Germany have distinctive cultures that shape central features of schooling such as the types of instructional practices used by national teaching corps. From this perspective the debate often turns on whether or not it is feasible to borrow educational practices from another culture (e.g., Bennett, 1987; Berliner & Biddle, 1995; Bracey, 1997; Goya, 1993; Ravitch, 1986; Stevenson & Stigler, 1992). The dominant image here is that unique national cultural values strongly influence instructional practice, classroom management, teacher preparation, textbook structure, and hence national academic success. (Compare Bracey, 1997 with Bennett, 1987.) While

often diametrically opposed in terms of their views about what American school reform ultimately should look like, commentators and reformers coming from this perspective assume that national cultures are "hard-wired" to cross-national differences in teaching.

This assumption, and the interest it generates in teaching styles in high performing Asian nations, has been fed by field studies of teaching in East Asian nations, the most prominent and well-developed set of research having taken place in Japan (Cummings, 1980; Hendry, 1986; Kinney, 1997-1998; Lewis, 1995; Lewis & Tsuchida, 1998; Peak, 1991; Rohlen & LeTendre, 1996; Stevenson, Azuma, & Hakuta, 1986). However, in U.S. policy debates, the culturally nuanced presentation is often lost (LeTendre, 1999b).

For example, a popular extension of the distinct national cultures model applied to international studies of schooling is that of national scripts that provide nation-specific ideals for teaching (see Stigler & Hiebert, 1998). Although it is assumed that at times individual teachers depart from their nation's script, the main image is that of a stable national ideal guiding the bulk of the instructional approaches within a nation (e.g., Stevenson & Stigler, 1992). This perspective is distinct from that of a national cultural dialog (or cultural dynamic), which can be found in the work of the Spindlers and others (see Spindler, Spindler, Trueba, & Williams, 1990), and which we discuss under the global cultural dynamic perspective.

The strength of a model of national culture as applied to teaching is that, first, it guides comparisons to focus primarily on any observed cross-national differences. All cross-national differences in teaching become salient and have inherent meaning if it is assumed that strong national cultures are at work behind the scenes in schools and underneath teachers' understandings of their jobs. Second, by assuming that there are national cultures of teaching it is feasible to consider borrowing unique solutions from one nation to the other. When a national culture is assumed to be real and distinct, it can also be assumed that relevant parts of it might be exportable to other nations. The policy argument then becomes centered on whether or not a piece of one culture (related to education) can be borrowed and adapted to fit into another culture, but this ignores how a culture may function as a whole. Lastly, the issue of national cultures provides some explanation of idiosyncratic historical differences between nations in the development of formal schooling.

Global Cultural Dynamics

In sharp contrast to the theory of national cultures is the theory of cultural dynamics found in comparative anthropological studies (e.g., LeTendre, 2000; Spindler & Spindler, 1987a; 1987b; Tobin, Wu, & Davidson, 1989).[1] In this

[1] Also, see the articles in *Anthropology and Education Quarterly 23*, (1), 1992.

model local, regional, and national cultures are produced through a continual process of cultural change (see Spindler, Spindler, Trueba, & Williams, 1990), which, both over time and across place, is often deliberately initiated by members of the culture to further their own political ends (see also Comaroff & Comaroff, 1992; Wolf, 1992). Schooling in any given society is caught up in this process, as is the teacher's work. This perspective on schooling suggests that schools do not reflect or simply transmit culture but are themselves the product of a cultural dynamic. In *Culture Change and Modernization* (1977/1984, pp. 4-5) Spindler writes:

> Culture . . . refers to shared designs for living. It is not the people or things or behaviors themselves. Culture can be equated with the *shared models* people carry in their minds for perceiving, relating to, and interpreting the world around them .... Sociocultural systems therefore include customary, agreed upon, *institutionalized solutions* which influence most individuals to behave in a predictable manner most of the time, but never all of the time. (Emphasis added)

For anthropologists and sociologists, institutions play a key role in the cultural dynamic. The rise of global or trans-national institutions now means that all cultures are affected by global forms of institutions (see Dimaggio & Powell, 1987). Global institutions transect and shape local, regional, or national versions of institutions (i.e., schools). The role of global institutional forces in the isomorphic spread of formal education has been the subject of intense study. The findings from this literature serve to bridge the ideas of a general dynamic cultural theory to macrosociological observations about the spread of global institutions of education (e.g., Fuller & Rubinson 1992). Further, these arguments offer a clear alternative to the perspective of national cultures of schooling with important implications for the use of cultural arguments in theory testing and debates over the improvement of teaching within any one nation.

In the current world system the global institution of school affects national school cultures. Our definition of *institution* is derived from works of the "institutionalists" in which formal schooling is seen as a key institution in modern and/or postmodern society (Boli & Ramirez, 1990; Meyer, 1977a, 1977b; Meyer, Ramirez, & Soysol, 1992; Ramirez & Boli, 1987).[2] Institutionalism is essentially a theory of culture, but institutionalists recognize the transforming power of a dynamic "world culture" that for better or worse evolved out of Western-style rationality and purposeful action (e.g., Berger, Berger, & Kellner, 1974). Rationality as a pervasive cultural product (some would say even a hegemonic product) of the historical rise of Western ideas serves to bureaucratize,

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[2] For brevity we refer to this theory as institutionalism even though sometimes a distinction is drawn between the "new" institutionalism of these theorists and an older sociological version of the role of institutions in society.

marketize, individuate, and homogenize the institutions of the world (Finnemore, 1996; Scott & Meyer, 1994; Thomas et al., 1987). These engaging principles form consistent norms of behavior across a range of modern institutions, thus tying institutions like the modern nation state and formal education together in tight political spheres.

Perhaps the main strength of a global cultural dynamic perspective is that it provides a general overarching theory of where educational change comes from that accounts for both local idiosyncratic histories as well as broad global trends. For example, institutionalism predicts that organizations do not embrace rational operations out of functional objectives like local demands for efficiency. Organizations adopt these operations as a way of adhering to a general culture that legitimates rational bureaucratic forms. Over time, formal education does not make counselors, nurses, or sexual harassment policies mandatory for all schools out of functional assessments of the psychiatric, health, and moral needs of each school's students. Instead, these organizational roles are bureaucratically spread as norms derived from a global institutional model of what a modern school must include to be counted as a "legitimate, rationally organized school" (see March & Olsen, 1976).

Given the degree to which the modern institution of school has penetrated most nations, similar educational processes are repeated in varying degrees around the world, creating considerable international isomorphism in schooling. For example, institutional studies of schooling have shown that curriculum across most nations has become very similar in content and intent over the past 100 years; attendance in public schooling for 10 to 12 years has become the norm in most nations; national governments typically assume a link between mass schooling and national human capital formation; and trends in school administration have become isomorphic globally (Baker & Holsinger, 1996; Benavot, Cha, Kamens, Meyer, & Wong, 1991; Fuller & Rubinson, 1992; Ramirez & Boli, 1987). Rationality, along with its offshoots of marketization, individualization, bureaucratization, and homogenization, plays the tune that all modern global institutions march to, but it itself is a cultural product and acts as such throughout the social system.

Another strength of this model is that it can account for the existence of important variations in the form of schooling. Significant variations from global institutions occur in some nations, such as Japan. These variations typically devolve from conditions governing the initial borrowing (Dore, 1973; Westney, 1987) or from conflicting institutional rationales or legal conditions (Lincoln, 1990). On the micro-social level a wealth of anthropological studies have documented the ways in which the globalized form of schooling is modified by local cultures (Anderson-Levitt, 1987; Ben-Peretz & Halkes, 1987; Flinn, 1992; Wolcott, 1967). Flinn, for example, describes this interaction of global institutions and local culture in describing schooling in the Pulap Atoll. Due to traditional forms of deference to male relatives, "female teachers often have to write

on the blackboard while sitting on a chair or kneeling on the floor" (p. 51). Yet, nevertheless, the school year, the schedule of holidays, and the curriculum itself are organized around the rationalized model of schooling, which now pervades the world system.

Both national and global dynamic cultural perspectives can be applied to cross-national comparisons of schooling. Both see schools, as well as the main tasks of instruction and the organization of teaching, as a chiefly cultural product. The key difference is that a global dynamic perspective suggests that all local, regional and/or national cultures are responding to a global cultural environment. This shifts the focus from a search for national scripts based on nationally idiosyncratic cultural values for teaching to an assessment of how international forces, such as institutional isomorphism, transform schooling in all societies.

Empirical Illustrations

We examine these contrasting assumptions about cultural and cross-national comparisons of teaching mathematics with data from the U.S., Japan, and Germany; the latter two being nations with histories that are clearly distinct from that of the U.S. and which are often considered in American policy discussions as international economic and educational competitors. The focus here is on teaching and the organization of the teacher's work as central features of schooling that are often influenced by culture. Although a full assessment of the contrasting assumptions of each perspective is beyond the analytic scope here, it is possible to undertake some revealing analyses. A national culture argument assumes plentiful, distinguishable cross-national variation in the ways teachers organize their instruction, as well as how their work lives at school is organized. By contrast, a global cultural dynamic argument assumes much the opposite and hence predicts considerable isomorphism across nations among these central educational processes.

We use comparable data from both the extensive survey and ethnographic field study on teaching in Germany, Japan, and the U.S. of the 1995 Third International Mathematics and Science Study (TIMSS). The survey data are taken from teachers of nationally representative seventh and eighth grade mathematics classes responding to a host of questions about their instructional practices and the organization of their work in schools.[3] The qualitative data are taken from the case study component, which is designed to capture local cultural influences on mathematics teachers (i.e., an intensive, field-based study of K-12 schooling in German, Japan, and the U.S. yielding verbatim transcripts of open-ended interviews and classroom observations).[4] Combining analyses of quantitative and qualitative data allows us to compose a detailed *and* representa-

[3] See Martin and Mullis (1996) or Beaton et al. (1996) for details regarding sampling, data collection, and quality assurance.

tive picture of the instructional activities of teachers and their ideas about instruction in these three nations.

Teachers and Their Basic Instructional Assignments

All schools in mass public systems have teachers, students, principals and a variety of support staff. However, as we look in more detail at the nature of the teaching profession and teachers' daily work, we find some striking differences. Some commonly used indicators of an occupation's level of professional status, such as gender composition, degree of specialization and years of experience, show Germany and Japan to have a more professionalized teacher work force than does the U.S. (see also Lortie, 1975 for a discussion of teacher professionalization). If we compare the backgrounds of mathematics teachers sampled by the TIMSS Population 11 (U.S. seventh and eighth grade equivalents) in the U.S., Japan, and Germany we find massive gender differences in the workforce. Over 70 percent of U.S. math teachers in the TIMSS sample are female, compared to less than 40 percent in Germany and only about 20 percent in Japan. There are also large differences in the amount of experience accrued by these teaching forces, with the German sample of teachers averaging almost 20 years of teaching.

As shown in Table 1, there are also interesting differences and similarities in the conditions of the job of teacher across the three nations. For Table 1 (and subsequent tables presented in this paper), the percentages in the bottom row of each table are derived from basic one-way analysis of variance (ANOVA) decompositions, where, for each variable, the overall variation among all teachers in the sample is divided into two additive parts: the amount of overall variation attributable to mean differences across three nations and the amount of overall variation attributable to differences among teachers within nations. The tables report the relative size of only the first component, variation attributable to differences in national means. The percentage of overall variation left unexplained by mean differences across nations can be attributed to variation among teachers within nations.

For example, there is little cross-national difference among the three nations for number of periods of instruction per week (4.1 percent). There are some cross-national differences in grade assignments (14.7 percent) and substantial differences in the teaching of mathematics (40.1 percent). German teachers spread their teaching out over more grades. More important is the fact that while nearly 100 percent of Japanese math teachers assigned instructional load is in math, American teachers average only 89 percent and German teachers only 57 percent. These findings suggest that some basic parameters of the teaching profession vary significantly across these three nations — differences that suggest

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[4] See Stevenson & Nerison-Low (2000) for details regarding sampling, data collection, and quality assurance.

there are national cultures of teaching that affect the basic tasks teachers are expected to do.

Although these are basic indicators, they are not superficial; they shed light on what kind of teachers are available for math instruction within a nation. For example, out-of-field teaching has been proposed as one serious problem in U.S. education, limiting the quality of instruction (Ingersoll, 1999, 2000). Japanese math teachers taught virtually all math. On the face of it, this difference would have a profound effect on the quality of instructional and on the way in which teachers conceptualize their role. For instance, if math teachers are teaching many classes in other subjects they will be forced to develop a substantially broader range of teaching, which can in turn lead to lower quality of instruction. Compared to American and German teaching conditions, those of the Japanese math teacher, with relatively few scheduled classes concentrated on mathematics and distributed across a smaller number of grades, suggest a more favorable context in which to focus on math as an intellectual subject.

These survey data show that other pertinent aspects of the work day differ among nations. American teachers have more tightly scheduled weeks than their

Table 1

Means in core instructional assignments for math teachers of seventh and eighth grade students

	Number of Instructional Periods Taught per Week		Number of Grades Taught in the Current Year		Percent of Total Instructional Periods in Math	
Nation	**Mean**	**N**	**Mean**	**N**	**Mean**	**N**
Germany	20.7[ab]	174	2.4[ab]	170	57[ab]	174
Japan	16.1[ac]	284	1.5[ac]	284	98[ac]	284
USA	18.6[bc]	378	1.6[bc]	380	89[bc]	378
Percentage of Total Variation Between Nations[d]	4.1%		14.7%		40.1%	

Source: TIMSS Population II Teacher Survey

[a] Significantly different than mean for U.S., $p < .05$.

[b] Significantly different than mean for Japan, $p < .05$.

[c] Significantly different than mean for Germany, $p < .05$.

[d] Percentages correspond to the relative size of the between-group component from a between- and within-group ANOVA decomposition where nations are the groups. Percentages indicate the amount of total variation observed among teachers in all three nations attributable to differences in national means.

Japanese or German counterparts. Also, in grades seven and eight, U.S. and German teachers get less common planning time than their Japanese counterparts. For example, 45 percent of teachers in Japan reported meeting at least once a week with peers as opposed to 37 percent in the U.S. and only 30 percent in Germany.

The case study data suggests that differences in planning time have major impacts on what teachers do in the classroom, both in terms of formally scheduled periods and in terms of national variation in planning. For example, German teachers rarely talked about common preparation periods or team meetings with colleagues; instead they tended to socialize during free periods and plan as a group during scheduled subject meetings, as one *Gymnasium* teacher describes it:

> I get to school at 7:30. School starts at 7:40. I teach advanced classes in math first, then I have several free periods in which I chat with colleagues or drive home. I come back to school in the afternoon. It is hard to prepare class here. Even the preparation room is always occupied with people who talk. I cannot concentrate there.
>
> Q: Where and when do you meet colleagues?
> A: Since every teacher has different free periods, subject conferences are arranged so that teachers who teach the same subject can meet and exchange ideas and concepts.
> Q: How often do you have subject conferences?
> A: Usually, we arrange conferences three times during the school term. It's funny but a few colleagues are not even happy having those few appointments and leave the conference early. Since they sometimes do not show up, we keep attendee lists.

In contrast, Japanese teachers frequently talked about meeting with other teachers to discuss lessons, planning as individuals, and taking time to study mathematics. The comments of a 32-year-old Japanese elementary school teacher, who had recently transferred from middle school, suggest that Japanese teachers are expected to maintain a high level of subject mastery by engaging in collaborative lesson study:

> Q: Now, you have come back to elementary. Why do you stay so late [at school]?
> A: Here, at elementary . . . the Japanese teachers in [this prefecture] have a kind of study/research group.
> Q: So each teacher, for example, Mr. K, studies arithmetic, and the other teachers study their specialty?
> A: Yes.

Although the TIMSS case study data suggest that such teacher-organized subject study is widespread in Japan (Linn, Lewis, Tsuchida, & Songer, 2000;

Lewis & Tsuchida, 1998; OERI, 1998, pp. 223-236), such organized subject study was rarely reported in the U.S. In all three nations, there is considerable variation in how individual teachers described the organization of their planning time but, on balance, teacher interviews suggest that in the U.S. there is more diversity among teachers than in the other two nations. In some districts American school teachers reported that they are supported by their schools with extensive planning period time, whereas in others teachers reported having no time to plan. At some schools, teachers are inundated with meetings, as one U.S. teacher attests.

> Q: Do you have much opportunity to interact with the teachers here?
> A: Just with my team. I mean in the department, I guess, interdepartmental meetings, grade levels, we do try to interact on a grade level setting . . . Usually toward the beginning of the year we all sort of get together and discuss how we will go about teaching the curriculum and then we do have monthly meetings with our math department and since it is just the two member team we have team meetings . . . at least two or three times a week.

Understanding when, how long, and with what purpose teachers meet together about instructional issues is a crucial area for future comparative study. While German and American teachers discussed studying mathematics, they did not refer to the kind of organized study programs that Japanese teachers referred to (Linn et al., 2000, pp. 11-12). Our findings also suggest that most U.S. teachers have little room for flexibility in their weekly schedules. These findings suggest that a teacher's work is constructed along national lines and that these patterns of work assignment are consistent with a national culture perspective.

Teachers' Non-Instructional Assignments

Moving from instructional load and planning, we see, in Table 2, that while there are statistically significant national differences in formal allocation of teacher duties outside of the classroom, the amount of variation explained by nations is much smaller than that found in comparisons of basic instructional load. For example, teachers in the U.S. reported three times the amount of time assigned to non-instructional supervision of students (6.6 periods) as their Japanese counterparts (2.24 periods) and six times as much as their German counterparts (.15 periods). In contrast, Japanese teachers reported more time on administrative tasks (2.43 periods) and counseling students (1.84 periods) and other non-student contact hours than did either their German or U.S. peers.

The case study data, again, support a national culture interpretation. In both the U.S. and Japan, teacher work norms include the expectation that teachers take on some extra duties for which they receive nominal or no extra pay. As one U.S. middle schoolteacher reported,

Table 2

Mean number of periods assigned per week for math teachers of seventh and eighth grade students

	Supervising Students		Counseling or Appraising Students		Administrative Tasks		Individual Planning		Group Planning	
Nation	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Germany	.15[ab]	158	.16[ab]	156	1.132[ab]	157	.09[ab]	158	.02[ab]	158
Japan	2.24[ac]	249	1.84[ac]	248	2.43[ac]	248	2.49[c]	250	.35[ac]	250
USA	6.60[bc]	368	.63[bc]	370	.46[bc]	367	2.88[c]	369	1.43[bc]	369
Percentage of Total Variation Between Nations[d]	12.4%		11.6%		8.6%		13.7%		11.1%	

Source: TIMSS Population II Teacher Survey

[a] Significantly different than mean for U.S., $p < .05$.

[b] Significantly different than mean for Japan, $p < .05$.

[c] Significantly different than mean for Germany, $p < .05$.

[d] Percentages correspond to the relative size of the between-group component from a between- and within-group ANOVA decomposition where nations are the groups. Percentages indicate the amount of total variation observed among teachers in all three nations attributable to differences in national means.

[At] 2:30 we escort the children out, and then at that point, most teachers come back and prepare for the next day. Some teachers like myself have a social center where there is an after school program that goes from 2:40 to 3:40 which for me occurs on Tuesdays to Thursday.
I have pom pom. . . . teachers [who] have their own after school program and it's just basically to keep the kids off the street, you know to introduce them to something different, there's sewing going on, there's art going on, there's sports going on, there's band, there's a lot of different activities that occur after school for the children.

But, U.S. teachers reported a work week that was significantly influenced by planning for (and adjusting to changes in) nonteaching work. U.S. teachers appear to struggle simply to do all the tasks required of them in a day. One U.S. middle school teacher described her day in this way:

A: OK, well we must be here by 7:30 and I'm usually between 7:15 and 7:30, earlier I guess this week because I have duty, cafeteria duty, all this week.
Q: Does that happen very often?
A: Well it does to me for this nine weeks because I do not have an elective, I'm not teaching an elective, whereas the next nine weeks, yes, I will, so I have first and second periods free so I have two planning periods in essence .... There are several other people who don't and we take care of the normal bus duty or the morning cafeteria duty, excuse me, or for the poor people who are in the ISS teacher [position]. She has no planning, she has no break all day long unless somebody goes in there and stays with her kids so one week. . . I would say that every single teacher has some kind of duty at least for a couple of weeks out of the year. That's pretty typical.

Overall, U.S. teachers reported having more periods scheduled to work on supervisory activities than did teachers in Germany or Japan. In Germany, few teachers reported supervisory duties. One teacher, who also played an administrative role, noted that in addition to her main duties of writing lesson plans for substitute teachers, she was also supposed to supervise the school grounds.

Japanese teachers, at least in the middle grades, often have extra supervisory duties, but these assignments tend to be flexible. One male middle school teacher reported letting his colleague pull the "lion's share" of such duties:

Q: Do you supervise a club?
A: Well as for the club, it isn't only me, there is another teacher also supervising it, so if I had to say I'd say I was letting the other teacher do it. So right now club activities don't take much of my time.

One caveat that must be kept in mind is that, over time in all three systems, the teacher's supervisory role changes substantially. Teachers of first graders the world over are responsible for a broader range of children's needs than are teachers of twelfth graders. The data we used focuses on the middle grades when teachers in most systems have to balance serious academic instruction

Table 3

Mean reported frequency of use of specific instructional practices for math teachers of seventh and eighth grade students

	Seatwork		Individual Guidance		Whole Class		Pair Work		Explaining Reasoning		Depict/Use Charts		Open-Ended Tasks	
Nation	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Germany	1.94	163	2.60[b]	163	2.78[ab]	163	1.81[b]	162	2.71[ab]	158	2.00[b]	162	2.05[ab]	163
Japan	2.07	284	2.27[ac]	279	2.99[ac]	284	1.59[ac]	284	2.92[c]	284	2.62[ac]	283	2.18[ac]	283
USA	1.97	342	2.66[b]	342	2.55[bc]	335	1.90[b]	335	2.91[c]	339	1.95[b]	338	1.83[bc]	338
Percentage of Total Variation Between Nations[d]	0.6%		7.4%		7.0%		4.5%		1.2%		19.9%		7.2%	

1 = "never or almost never"...4 = "every lesson"

Source: TIMSS Population II Teacher Survey

[a] Significantly different than mean for U.S., $p < .05$.

[b] Significantly different than mean for Japan, $p < .05$.

[c] Significantly different than mean for Germany, $p < .05$.

[d] Percentages correspond to the relative size of the between-group component from a between- and within-group ANOVA decomposition where nations are the groups. Percentages indicate the amount of total variation observed among teachers in all three nations attributable to differences in national means.

with supervision of student activities that are designed to encourage social development. In this regard, data from the middle grades may exhibit clearer patterns of national difference than that from teachers working among twelfth graders. Nonetheless, at this level the case study data suggest that the supervisory duties reported by most U.S. teachers mean less autonomy to control the flow of work in a given day or week compared to their Japanese or German counterparts.

Instructional Practices

The publicly released TIMSS video clips of teaching of mathematics in the three nations, as well as summary reports on the videos, support the perspective that teaching is significantly shaped by national culture. In reports on the video study Stigler and Hiebert (1998, 1999) adopt a national culture perspective focused on pedagogic practice in Japan as a tool for improvement of pedagogical practice worldwide. Hence their summaries of the video are very sensitive to any differences in instructional practice and attempt to establish the image of a national script for teaching from nation to nation.

Our analysis of what teachers report they do in teaching mathematics suggests that a more complicated perspective is necessary. For example, as shown in Table 3, when we look at a range of core instructional practices, such as using pair work, seatwork, or whole class instruction to instruct students, we find strikingly little cross-national variation. Very modest proportions of the total between-teacher variation in teacher instructional practice is due to the nation in which they teach, except for the use of charts (19.9 percent). The basic process of teaching in the three nations is very homogenous — evidence of isomorphism that has made actual instruction in classrooms very similar across these nations and perhaps across most others as well.

The findings from the survey data strongly match the conclusions of the International Association for the Evaluation of Educational Achievement classroom environment study in eight nations indicating that what teachers do in the classroom is remarkably similar across nations: "teachers in all countries indicated they used whole class instruction more frequently than small group instruction to review previously taught content. In fact, teachers in all countries reported spending little if any time in small group instruction" (Anderson, Ryan, & Shapiro, 1989, p. 84).

Contrary to the assumption that national cultures work to produce "unique" patterns of classroom instruction in the U.S., Germany, and Japan, we find significant isomorphism in core instructional practices, at least in terms of relative frequency of use. Here we must interject a caveat. The level of reporting in the survey data is not sufficient to differentiate between different kinds of "groupwork," for example. We do not know if the teachers were using heterogeneous or homogenous ability groups, nor what task the groups were given. Thus, while

these data indicate that math teachers in the three countries use basic instructional practices for relatively the same proportion of time, the data do not allow a more fine-grained analysis of how each practice is enacted. If we simply look at the overall frequency of basic instructional practices that mathematics teachers use, then Japanese, German, and U.S. teachers all appear to be working from a very similar "cultural script," which is exactly what proponents of institutional isomorphism would predict.

So far, our empirical illustration appears to support both perspectives, albeit at different levels. Teachers work in organizations where the contours of the work day and work week are influenced by national variation in educational labor arrangements and some cultural expectations for the role of teacher. At the same time, teachers work inside classrooms where the basic instructional processes appear to have undergone significant crossnational isomorphism. Apparently, teachers may be affected by different sets of institutional rationales. Another way to assess the relative impact of these two perspectives is to examine how mathematics teachers think about their jobs.

Beliefs About Teaching Math

A national culture perspective would suggest that teacher perceptions and beliefs about math and teaching would be an important factor affecting how teachers use certain instructional practices (cf. Stigler & Hiebert, 1998), whereas a global cultural dynamic perspective would predict that teachers beliefs and practices would be affected by the globalized, rational account of the school (cf. Meyer, 1977b). Some previous studies support a national culture perspective, for example: Japanese teachers tend to discount large innate differences in intelligence, or capacity for learning, and vigorously oppose tracking at the elementary and middle school level (OERI, 1998, p. 41). Stigler and Hiebert (1999, p. 94) also state that Japanese teachers view "individual differences" in the math classroom "as a natural characteristic of the group" and as "a resource for both students and teachers." This interpretation is consistent with previous research in this area (Lee, Graham, & Stevenson, 1996; Stigler, Fernandez, & Yoshida, 1996).

However, in the TIMSS survey, when teachers were asked to agree to various sets of statements, such as "some students have a natural talent for mathematics and others do not," we find similar percentages of Japanese and U.S. mathematics teachers disagreeing with this statement (28 percent for Japanese and 21 percent for U.S. teachers) whereas only about 11 percent of German teachers disagree. The responses to this single question do not invalidate the notion that Japanese teachers in general have a strong ideal that individual differences should not be a factor in affecting mathematics achievement. They do show, however, that teacher beliefs are far more complex than previous images of national cultural scripts for teaching would suggest.

Table 4

Mean perceptions about what limits teaching in math teachers of seventh and eighth grade students

	Different Abilities		Uninterested Students		Parent Interest		Computer Shortage		Teacher Student Ratio	
Nation	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Germany	2.55[b]	163	2.47	163	1.37[a]	163	1.32[a]	162	2.02[b]	163
Japan	2.75[ac]	284	2.83[a]	284	2.36[a]	283	1.44[a]	283	2.34[ac]	283
USA	2.48[b]	339	2.57[b]	339	1.56[bc]	336	2.06[bc]	338	2.07[b]	338
Percentage of Total Variation Between Nations[d]	2.7%		1.0%		1.8%		13.9%		1.8%	

Reported Degree of Impact (1 = "not at all"...4 = "a great deal").

Source: TIMSS Population II Teacher Survey

[a] Significantly different than mean for U.S., $p < .05$.

[b] Significantly different than mean for Japan, $p < .05$.

[c] Significantly different than mean for Germany, $p < .05$.

[d] Percentages correspond to the relative size of the between-group component from a between- and within-group ANOVA decomposition where nations are the groups. Percentages indicate the amount of total variation observed among teachers in all three nations attributable to differences in national means.

As shown in Table 4, there is considerable cross-national similarity in how teachers think about obstacles and resources in teaching mathematics. There was little cross-national variation in teacher beliefs about the limits placed on learning due to qualities of students (different abilities, 2.7 percent, lack of motivation, 1.0 percent, parent's interests, 1.8 percent) or even the student-teacher ratio (1.8 percent).

This lack of substantial cross-national differences among teacher's beliefs about differing student abilities is of particular interest when contrasted with the recent discussions in the U.S. about how Japanese find individual differences to be helpful to their instructional practices (Stigler & Hiebert, 1999).[5] In the present sample, Japanese math teachers see "students with different academic abilities" as slightly more of an obstacle in teaching (2.75) than their German (2.55) and U.S. (2.48) counterparts.

While Japanese teachers in general may believe it is best to concentrate on student effort rather than ability, the case study data (OERI, 1998, p. 84) show that Japanese have several indigenous terms for labeling individual ability differences (e.g., *saino*, talent or giftedness; *soshitsu*, innate abilities or gifts). One Japanese teacher listed four elements in individual ability differences that are recognized by many Japanese teachers: (1) genetic disposition, (2) education and support from parents, (3) classroom environment and atmosphere, (4) acknowledgment in school.

This evidence of a substantial range of variation in teacher beliefs within a nation, combined with similar average beliefs across these nations on questions about what teachers believe limits teaching and learning, presents serious questions about the assumption that cross-national differences in beliefs or values held by teachers are the root of major cross-national differences in instructional approaches. Finally, as Table 5 illustrates, the teachers in this sample display remarkable cross-national isomorphism on a wide range of beliefs about how mathematics is learned. In this empirical illustration there is virtually no cross-national variation in perceptions of fundamental learning processes (with the exception of a modest differences in the use of practice as an important aspect of learning, 14.0 percent). Again, such evidence makes it hard to assume that differences in mathematics teaching are a direct result of cross-national differences in the beliefs and attitudes that teachers have towards teaching or learning.

These five variables represent a small sample of the total available in the TIMSS data set. We must exert caution in overinterpeting these results, and of course we only present here the simple, bi-variate analyses. There is always the possibility that more complex multivariate modeling might uncover a different cross-national pattern, although we suspect that this is unlikely. And even in

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[5] For example, note the usual assumptions about differing Asian and Western cultures of schooling in arguments that do not necessarily embrace the popular positive image of Japanese education in Bracey (1997).

Table 5

Mean beliefs about learning math for math teachers of seventh and eighth grade students

	Math is Primarily an Abstract Subject		Math is Primarily for Addressing Real Situations		If Students Have Difficulty Give More Practice		Some Students Have Natural Talent		Liking Students is Essential for Teaching	
Nation	Mean	N	Mean	N	Mean	N	Mean	N	Mean	N
Germany	2.23[b]	167	2.83[a]	164	2.79[ab]	167	3.06[ab]	167	3.20[ab]	167
Japan	2.62[ac]	283	2.92[a]	281	2.20[ac]	283	2.78[ac]	281	3.43[c]	281
USA	2.17[b]	360	3.11[b]	358	2.06[bc]	360	2.89[bc]	359	3.48[c]	358
Percentage of Total Variation Between Nations[d]	8.6%		4.3%		14.0%		2.4%		3.0%	

Reported Degree of Impact (1 = "not at all"...4 = "a great deal").

Source: TIMSS Population II Teacher Survey

[a] Significantly different than mean for U.S., $p < .05$.

[b] Significantly different than mean for Japan, $p < .05$.

[c] Significantly different than mean for Germany, $p < .05$.

[d] Percentages correspond to the relative size of the between-group component from a between- and within-group ANOVA decomposition where nations are the groups. Percentages indicate the amount of total variation observed among teachers in all three nations attributable to differences in national means.

these analyses mean national differences, when found, are not always in the direction predicted by scholars who adopt a national culture argument. For example, Japanese teachers emphasized thinking creatively in math more than U.S. teachers did, but U.S. teachers were more likely to emphasize understanding mathematical concepts and understanding real-world usage — beliefs one would assume to be more characteristic of Japanese teachers who have been shown to spend much time on concept development and application of concepts, at least in science classes (Linn, Lewis, Tsuchida, & Songer, 2000).

Indeed, looking for a pattern of global agreement about key ideas is more fruitful than looking for a pattern of national differences. In analyzing the wider range of TIMSS Population II variables not presented here, we found that German, Japanese, and U.S. math teachers in the TIMSS rank "students with different academic abilities" and "uninterested students" as far more of a challenge to their teaching than the other factors presented to them in the survey. These teachers also agree that using multiple representations in teaching math as well as a liking and understanding of students are more important to math learning than just teaching basic computational skills.

Turning back to the case study data, which on the surface suggest strong national cultures, we find that Japanese classroom instruction in the middle grades is influenced by the high school entrance examination system. Since most teachers wish to send as many students as possible to the best high school in the community, they closely follow the national curriculum on which the public high school entrance examinations are based. Japanese teachers feel responsible to give all classes the same opportunity to succeed on the exam. Teachers believe there are individual ability differences, but they also believe that there are individual differences in effort, and in balancing the equation of effort and ability, teachers tend to favor ability. When asked about ability grouping in class, one Japanese teacher responded: "I don't think that's acceptable. I don't think it's a very democratic way of handing the situation."

Most Japanese teachers recognize that effort is an essential ingredient in developing these gifts and tend to emphasize effort in a way that most U.S. teachers do not, yet Japanese teachers recognize individual differences and the consequences of those differences will have on the important high school entrance exam. Perhaps Japanese teachers find themselves in a quandary when faced with multiple-ability levels in the same classroom: Do I spend more time on the "slower" students or pump up the "fast" ones? The following exchange between a TIMSS researcher and a middle school science teacher in Japan clearly demonstrates the conflicts Japanese teachers face:

> Q: Do you divide your students into groups according to ability?
> A: No, I don't do that. In Japan, that will never work positively because students would feel ashamed.
> Q: Are you, then, doing anything special to cope with individual differences?
> A: I give them *houshuu* [extra practice]. I first give them a hand out on a cer-

tain lesson, and tell them that if they don't understand, they could attend *hoshuu* after school.
Q To/for what level of students are you giving *hoshuu*?
A: I am hoping that the students who are below average would come to *hoshuu*. Those who do well can solve problems on their own. So *hoshuu* is aimed at the students who are having a hard time trying to find out the way to solve problems. But we cannot provide *hoshuu* everyday, so I know it isn't enough.

This Japanese teacher faces a dilemma. Partly the dilemma arises from contradictions between cultural ideals; partly it arises from the working conditions of teachers in modern, democratic nations. This teacher's dilemma will be immediately familiar to most U.S. educators. Despite the cultural and historical differences between the U.S., Germany and Japan, teachers in these three nations often face very similar conditions or problems. The problem of providing adequate instruction to a class consisting of students with heterogeneous ability levels is not determined, or solved by, cultural beliefs. All over the world, not just in the U.S., Germany, or Japan, educators face significant problems in trying to provide equal access to the curriculum for all while simultaneously working to maximize each student's individual potential.

Culture and Institutional Context of Teaching: Nationally Bound or Globally Dynamic?

The illustrative analysis presented here shows that in these three nations globally transmitted institutions play a key role in determining instructional practice and teacher beliefs. Both for anthropologists such as Spindler (1977/1984) and for sociologists such as Zucker (1977), socio-cultural change and cultural persistence in the modern world system centers on institutionalized organizational forms (i.e., the institution of hospitals or schools as opposed to the specific organizational reality of the local hospital or school). As Douglas (1986, p. 46) wrote, "established institutions, if challenged, are able to rest their claims to legitimacy on their fit with the nature of the universe." The overall "charter" of the modern school is in large part a global one (cf. Meyer, 1977a).

Teachers in modern nations such as Japan, Germany, and the U.S. go about their jobs in highly institutionalized social settings where their identities are shaped by the existing institution and where the patterns of their work are driven by the rules and procedures of the specific school (organization) in which they work and the larger institution of schooling. Institutions "channel our perceptions into forms compatible with the relations they authorize" (Douglas, 1986, p. 92). While this is true, it would be inaccurate to suggest that our analysis shows no national differences. What has been overlooked in cross-national comparisons of teaching is how teachers are simultaneously affected by at least three culrural levels: (1) a global institutional form of schooling; (2) national or

regional laws that affect the organization of schools; and (3) national, regional, or local systems, customs and expectations.

While there are undeniable national cultural factors that affect teaching in the U.S. and other nations, an overemphasis on the effect of the general "culture" or cultural ideals within a given nation leads to studies that downplay how global dynamics in national educational policy and school organization affect teachers' working lives. The global isomorphism of schooling that has occurred in the last century is a process that creates similar predicaments for teachers. Classroom environments are remarkably similar around the world, and teachers must work within rather homogenous parameters of instructional practice that are institutionalized on a global level.

National cultural arguments tend to reify a view of culture as roughly defined as the language, value, and beliefs of a given group of people. This view of culture misses two major trends in cultural theory: (1) that culture is a dynamic process and that socialization into national or regional cultures is uneven, and (2) that all modern nations have "cultures" that are significantly influenced by the rationalization of society and spread of institutions that has taken place over the last century. Much of the "culture" of nations like Japan, the U.S., and Germany is embedded in shared common institutional forms establishing similar organizational patterns based on a single overarching model, e.g., the hospital, the school, the legislature, and the corporation.

There is good empirical evidence to show that in some cases national cultures can alter global institutional forms as they enter a country (e.g., Westney, 1987) just as there is evidence that a nation's legal code can create diverse, national institutional variants. The idea that teaching is primarily a cultural activity, or that a whole nation of teachers follow what some have called a "national script" for teaching, glosses over the fact that a variety of individuals and organizations make rules, policies, and laws that significantly affect the way teachers organize their day and that these individuals and organizations are affected by changes in the world in general.

In terms of the instructional core of teaching mathematics (e.g., basic classroom), teachers are clearly very similar in the U.S., Japan, and Germany, as their work is conducted in schools that have undergone a process of global isomorphism over the last 100 years. The fact that individual teachers' perceptions and beliefs are strikingly similar cross-nationally suggests that teachers' reports of how they view the act of teaching mathematics and the nature of this subject may be more influenced by the global institution of schooling than by national culture.

Yet in terms of the broader role of the teacher (the total range of duties, services, or responsibilities teachers are expected to fulfill) national cultures still have an influence. As we noted above, these basic differences in overall teacher work patterns may have significant impacts on the specific enactment of core instructional practices in the classroom. The fact that Japanese teachers teach

comparatively few periods, specialize in math, and have ample planning time makes possible the kind of elaborate lesson planning documented by Lewis and Tsuchida (1998) and might encourage Japanese math teachers to focus more on mathematical reasoning as opposed to memorizing concepts.

Culture and International Data: Assumptions for Policy Making

We began by noting the extensive use of comparative data from different nations in U.S. policy debates and the accompanying use of contrasting, yet often unspecified, assumptions about culture and its role in the creation of cross-national differences. After our brief assessment of these assumptions about culture, what lessons are there for the incorporation of cross-national data into policy formation?

Neither our results nor our reading of the supporting literature on culture and education suggest that there is an "either or" conclusion to be made between these two views of culture and education. Both notions of culture — a dynamic global institutional one and a national one (as well as regional and local ones) — have some merit from which to consider cross-national data for use in policy discussions. But the results here, particularly those on the extreme degree of isomorphism of core instructional practices and teacher beliefs, offer some important caveats to the entire enterprise of extensive use of national cultural images to incorporate intentional information into discussions about educational reform in the U.S.

A general national culture perspective has been the popular view applied to these kinds of data. People seem to like to think this way. Other nations seem exotic from afar and the image that their institutions run in very different ways from familiar ones at home is easy to seize upon. Indeed, most nations-states rely heavily on myths of self-contained or autochthonous cultures to legitimate their existence (see Anderson 1991). But our results presented here suggest a real danger in taking a national cultural image too far. The concept of a "national script" for teaching is an amalgam of cultural ideals about what should happen in an ideal lesson in this nation, not what actually occurs.

Idealized images of the perfect instructional activity, as every teacher knows, rarely materialize in the classroom. Not only does each class of students present a unique social situation; teachers themselves vary in their stated ideals. And, if there are general beliefs about the ideal role of the teacher (or expectations for how teachers "should" behave) that are unique to a modern U.S., Japan, or Germany, these must be expressed in institutional forms (schools) that are largely derived from the same Western notion about the institution of schooling.

Over time, local accommodations and adaptations occur in all nations both in terms of individuals conforming to ideals transmitted via a global institutional form as well as modifications individuals make in how they enact their institutional role within a specific organization. Cross-national idealization of other

nations misses these two processes; it assumes them away and is therefore a particularly problematic image for realistic policy discussions about cross-national data.

A related problem with too much reliance on an image of national cultures is the slippery slope of "selecting on the dependent variable" in the use of cross-national data. All too often it is easy to start an analysis of this kind of data by thinking, if nation X outperforms nation Y in achievement, then any and all differences between them are possible causes of this differences. The salient features of schooling in nation X soon become celebrated as causes of superior performance, and hence unusual educational features in nations like Japan and Singapore take on untested prominence in policy debates about improving education in other nations like the U.S. Research suggests that lessons in Japanese middle grades elementary and math classrooms "flow like a river," that there is a swift, connected stream of material moves at a brisk pace (Linn, Lewis, Tsuchida, & Songer, 2000). In contrast, some have described the U.S. curriculum as a river that is "a mile wide and an inch deep," a metaphor that implies lessons cannot move in a brisk, connected way (Schmidt, McKnight, & Raizen, 1997). Debates about such differences often invoke cultural differences between "Asian" and "Western" attitudes toward education, but these cultural ideas are rarely if ever tested, yet they become part of the lexicon of international comparisons, accepted and assumed to be true.

This is not to say that cross-national data are not useful or that nations do not have different, interesting, and potentially useful ways of organizing schooling, teachers, and teaching. They clearly do, and wise use of cross-national information can be very enlightening to policy discussion. Our caution is that the unspecified assumptions inherent in an image of national cultures leads to too much idealization and celebration of national differences without clear thought on what these differences may really mean for exportation of better educational approaches.

Similarly it is dangerous to imply that a global dynamic culture pushes everything everywhere to be the same at all times. Empirically this is not true and conceptually it leads to a theoretical dead end where unique national and local change is impossible. However, the forces behind global institutional isomorphism are considerable and failing to recognize their power in all organizations within the same institutional sector everywhere in the world is a route to an unclear picture of how culture actually works in a dynamic fashion. Cross-national studies of teaching need to consider and theorize as much about isomorphic processes as they currently do about national processes. The challenge for future cross-national research, and its use in policymaking, is to continue to push our theoretical models of culture and the educational process to reflect more accurately the complex empirical reality of the classrooms around the world.

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The Learning Styles of High-Achieving and Creative Adolescents in Hungary

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The learning-style preferences, levels of academic achievement, and extracurricular creative activities among students from one junior high school and four high schools in Hungary were investigated and compared. The Learning Style Inventory (Dunn, Dunn, & Price, 1996 and the Tel Aviv Activities Inventory (Milgram, 1987) were used to identify learning-style preferences and areas of creative performance prevalent among these students. High, average, and low academic achievers and students creative in various domains demonstrated significantly distinct learning-style characteristics.

Introduction

Hungary is a small country tucked away in the Carpathian Mountains in Central Europe. Traditionally, education in Hungary has been regarded as a privilege and a valuable commodity. At the same time, basic education is considered a right of all citizens and is provided free of charge through the high school level. Most secondary schools, however, are highly selective in their admission procedures. Students' grade-point averages, academic grades, and nonacademic achievements are all taken into consideration. Demonstrating one's knowledge and skills in national examinations at the high school level is required for graduation. Being accepted into a college is also rather competitive. Just recently, however, colleges introduced a tuition system that allows for less competition among students and more competition among their parents' income.

Rationale

In the late 1990s, the Hungarian Ministry of Culture and Public Education developed new national curricula and standards, which were designed to facilitate (a) the appreciation of the Hungarian culture and heritage; (b) the promotion of European democratic values; (c) the expansion of global education; (d) the development of environmental awareness; and (e) age-appropriate intellectual, psychological, and physical growth (Nemzeti alaptanterv, 1995). According to these guidelines, the main mission of schools is to aid students in maximizing their intellectual capacities and developing their characters. In addition to the elaborate guidelines on teaching content area material, the new curriculum guide devoted a single paragraph to the recommendation that educators help students acquire successful learning strategies by responding to their pertinent develop-

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mental characteristics and "individual learning types, learning styles and habits" (p. 13). However, no definitions or descriptions of what exactly is meant by learning types, learning styles, or habits were given, and no specifications were provided on how to identify or respond to these individual differences. To date, there has been limited research on learning styles in Hungary, and the effects of analyzing the creative achievements and identifying and accommodating the learning-style preferences of Hungarian adolescents have not been reported (Balogh, 1998; Hanula, 1997).

Approaches that invoke creativity, utilize multiple intelligences, or individualize instruction based on students' learning-style preferences — all well-known and widely utilized in the United States — are largely unfamiliar to Hungarian educators. In most Hungarian schools, instruction is still typically undifferentiated and is conducted in a conventional format. Students are regularly expected to memorize the content area material covered in class and are given limited opportunities to capitalize on their personal learning-style strengths, encounter problem-centered content, or sharpen their critical and creative-thinking and problem-solving skills. Yet, if students are expected to learn and retain complex information and maximize their creative potential to be successful, lifelong learners in the new millennium, their learning-style preferences need to be identified and accommodated (Dunn, 1999/2000). This study investigated and compared learning-style preferences, achievement, and extracurricular creative activities among Hungarian secondary students.

Theoretical Background

Creativity. Creativity is often discussed in terms of a person — someone who demonstrates originality — or in terms of a novel product or valuable achievement that is the outcome of a creative process. This, in turn, is the production of something new and original. Further, a situation may also be creative inasmuch as it contributes to the emergence of creative people, products, and processes (Eysenck, 1994). The mystery and perplexity of the concept of creativity was emphasized by Boden (1994):

> Creativity is a puzzle, a paradox, some say a mystery. Inventors, scientists, and artists rarely know how their original ideas arise. They mention intuition, but cannot say how it works. Most psychologists cannot tell us much about it, either. What's more, many people assume that there will be a scientific theory of creativity for how could science explain fundamental novelty? As if all of this were not daunting enough, the apparent unpredictability of creativity seems to outlaw any systematic explanation, whether scientific or historical. (p. 75)

Despite the proposed impossibility of a scientific approach, there are a number of theorists who aspired to explain and understand the essence of creativity. Creativity theory has expanded beyond the four static elements of creativity

suggested by Rhodes (1961), which were the four Ps: *person, process, product,* and *press*. Recently, the complexity of creativity has been underscored by models developed to explain various possible components of creativity and the dynamic interactions taking place among the variables.

Selected examples of these complex models include those of both Sternberg and Feldman. In Sternberg's (1988) three-facet model of creativity, three interacting aspects — (a) cognition or intelligence, (b) the use of this intelligence or one's intellectual style, and (c) personality variables — lead to creative performance. In 1997, Sternberg and Lubbart rearranged the elements of this model and identified six factors that stimulate or impair creativity: *intelligence, knowledge, thinking styles, personality, motivation,* and the *environmental context*. Feldman (1988) recognized three essential aspects of creativity: (a) the mostly nonconscious *transformations* produced by the mind, (b) the conscious *urge to make a positive change* in the world, and (c) the outcomes of *previous products of creativity* available for all those who wish to change the world further in a creative fashion.

In addition, Woodman and Schoenfeldt's (1989) interactionist model combined personality along with cognitive and socio-psychological perspectives. Similarly, Eysenck (1994) suggested that three sets of interacting variables — cognitive, environmental, and personality — lead to creative achievements. In the COCO model, Treffinger and Selby (1993) described four basic components of creativity — (a) *characteristics* of people, (b) the *operations* they perform, (c) the *context* in which people function, and (d) the *outcomes* that follow from their endeavors — and the interrelationship among them.

The systems approach to creativity is represented in Gardner's and in Csikszentmihalyi's work. Gardner (1993) expanded Csikszentmihalyi's (1988) earlier version of his systems model and created a framework to study creativity at four levels: (a) the *subpersonal* level, in which the creative individual is analyzed in terms of neurobiological factors; (b) the *personal* level, in which cognitive and noncognitive features are considered; (c) the *impersonal* level, in which the individual operates; and, finally, (d) the *multipersonal* level, in which institutions evaluate the products in a specific domain. In Csikszentmihalyi's (1996) refined systems model for creativity, a dynamic interaction is suggested among the three parts of a system: (a) the *individual* person, (b) the formal structure of knowledge in a particular *domain*, and (c) the institutional gate-keeping mechanism referred to as the *field*.

A holistic approach to creativity was demonstrated by Cropley (1997), who described cognitive, affective, motivational, and social/personal factors that interact in the process of generating a creative product. The complex process of creative production is divided into stages — information, incubation, illumination, verification, communication, and validation — each of which is characterized by one or more of the following cognitive and emotional processes: inter-

est, curiosity, determination, fascination, excitement, satisfaction, pride in oneself, anticipation, hope, and elation.

As previously noted, students in Hungary usually experience undifferentiated instruction that is conducted in a conventional format and is not considered conducive to either personalized or creative behaviors. In an attempt to identify creative potential and behavior, it was, therefore, important to focus on settings and creative behaviors beyond the school context. Consequently, Milgram's Tel Aviv Activities Inventory (1987) was selected for the purposes of this investigation because it was designed to assess adolescents' out-of-school creative accomplishments in domain-specific areas. The inventory naturally fits within Milgram's (1989) 4 x 4 model of giftedness, and it directly relates to the model's final category. Milgram's model has been supported by previous correlational research conducted with the learning styles and creative accomplishments of over 8,000 adolescents and young adults (Ingham, Ponce Meza, & Price, 1998; Milgram, Dunn, & Price, 1993; Pengiran-Jadid, 1998; Ponce Meza, 1997). In this model, four levels (profound, moderate, mild, and nongifted), three settings (home, school, and community), and four categories of giftedness were described. General intellectual ability refers to an overall intelligence and ability to solve problems and think abstractly. Specific intellectual ability is expressed in outstanding (nonoriginal) performance in a given academic area such as science, mathematics, or languages. General original thinking is considered divergent thinking or raw creativity. Finally, specific creative talent refers to the generation of original ideas or products in domain-specific areas such as science, music, or art.

Learning styles. The concept of learning styles — the understanding that individuals master new and difficult information or skills in different ways — emerged from cognitive-style research in American education approximately four decades ago (Sternberg & Grigorenko, 1997). Recently, it has become more widely researched and accepted by educators in the United States and throughout the world because it recognizes students' individual preferences, needs, and strengths and, thus, encourages educators to provide individualized instruction (Milgram, Dunn, & Price, 1993).

In an overview of learning styles, Fizzell (1984) recognized three different trends in learning-style research. In a global approach, learners are characterized according to a limited number of general categories, such as in the work of Gregorc (1982) and Kolb (1976/ 1984). In a highly analytic approach represented by Hill's (1976) cognitive mapping, each 'individual's multiple learning characteristics are examined in minute details. Finally, in between these two extremes are school-oriented approaches, typified by the Dunn and Dunn Learning-Styles Model (1978), which is "closely tied to actual classroom conditions and techniques, and may be considered and planned for in developing programs for one's students" (p. 305).

Among the many learning-style models, only three comprehensive learning-style models have been developed — those of Dunn and Dunn (1978), Hill (1976), and Keefe and Monk (1986). For the purposes of this study, the Dunn and Dunn Learning Styles Model has been selected because it (a) is one of the comprehensive models, (b) is supported by the most national and international research and was used with general and special education students in all subject areas (preschool through college), (c) has documented that instruction that matches students' learning-style strengths results in improved academic achievement and attitudes (Dunn & Dunn, 1992, 1993), (d) provides the basis for a diagnostic-prescriptive approach and has support instrumentation to offer guidance to students in a practical way, and (e) has instruments that have been evaluated as both valid and reliable (Curry, 1987; DeBello, 1990; Tendy & Geiser, 1998/1999).

Dunn and Dunn Learning-Styles Model

Learning style is defined as the way in which individuals begin to concentrate on, process, internalize, and retain new and difficult information (Dunn & Dunn, 1992, 1993; Dunn, Dunn, & Perrin, 1994). The model's elements are grouped into five strands — environmental, emotional, sociological, physiological, and psychological. At the environmental level, students' preference for sound, light, temperature, and furniture/seating design are examined. At the emotional level, the focus is on students' level of motivation, persistence, responsibility, and how much structure they require. Sociologically, students' preferences for learning alone, in pairs, in groups, with or without authority, or in a variety of patterns are considered. Physiologically, perceptual strengths (visual, auditory, tactile or kinesthetic), time-of-day energy levels, and the need for intake and mobility are determined. Finally, psychologically, the information-processing styles of learners — global or analytic and impulsive or reflective — are examined.

In the past 30 years, research based on the Dunn and Dunn model has revealed significant differences between the learning styles of underachievers, high achievers, and gifted and talented students (Center for the Study of Learning and Teaching Styles, 2000). International research conducted in nine countries with close to 6,000 participants on learning styles and creativity identified the learning-style preferences of gifted and nongifted adolescents (Milgram, Dunn, & Price, 1993). It revealed interrelationships among learning styles and giftedness in eight creative domains, and explained the cultural impact of learning-style preferences and creative talent areas on students. It was demonstrated that (a) gifted and nongifted students significantly differed in their learning-style preferences; (b) creative students in each domain had similar learning-style preferences, regardless of cultural background; (c) cross-cultural differences existed among the examined groups of students; and (d) opportuni-

ties in which to develop creativity had an apparent impact on whether students developed those specific talents or not. Finally, it was found that despite the learning-style differences among the culturally diverse groups, there were as many differences within each group as between groups.

Method

Sample

A total of 302 students participated in this study. The sample represented the total population of five schools — a high-achieving model junior high school (Kossuth Lajos Tudomány Egyetem Gyakorló Altalános Iskola), a high-achieving model high school (Kossuth Lajos Tudomány Egyetem Gyakorló Gimnáziuma), a drama and performing-arts high school (Ady Endre Gimnázium), a music high school (Kodály Zoltán Zenemûvészeti Szakközépiskola), and a technical high school (Brassai Sándor Mûszaki Szakiskola) in Debrecen, the second largest city in Hungary. The students were from lower- to upper-middle-class families. The sample included 136 boys and 166 girls, 44 seventh graders, 132 ninth graders, and 126 eleventh graders. The number of students in each school included 44 from the high-achieving model junior high school, 67 from the high-achieving model high school, 58 from the drama and performing-arts high school, 68 from the music high school, and 65 from the technical high school. In each school, preformed classes of students were selected at the discretion of the local administration, with the only restriction being that of limiting participation to seventh, ninth, and eleventh graders.

Materials

Learning Style Inventory. The Hungarian version of the Learning Style Inventory (LSI) (Dunn, Dunn, & Price, 1996) for grades 5 through 12 was used to identify the learning styles of the participants. The LSI is a 104-item, self-report questionnaire, which was developed through content and factor analyses. It uses a 5-point Likert scale and can be completed in approximately 30 to 40 minutes. The LSI has both high reliability and face and construct validity (Kirby, 1979). Among nine different instruments that measure learning style, the LSI was rated as having good or better validity and reliability than the others (Curry, 1987). Based on the LSI scores of 817 randomly selected students in grades 5 through 12, Price and Dunn (1997) reported that 95% (21 out of 22) of the learning-style elements had reliabilities equal to or greater than 0.60 for the Likert scale of the English version of the LSI. Based on the scores of the present Hungarian sample, the reliability coefficients separately calculated for each element of the Hungarian translation ranged between 0.59 and 0.91.

Tel Aviv Activities Inventory. The Tel Aviv Activities Inventory (Milgram, 1987) was administered to all the participating students. It is a 63-item biographical questionnaire, which measures the respondents' interests, activities, and accomplishments outside school in the following eight domains: science, social leadership, dance, music, fine arts, literature/writing, drama, and sports. Construct validity and predictive validity for the instrument were established by Milgram, Dunn, and Price (1993).

Hong, Whiston, and Milgram (1993) investigated the construct validity and factor structure of the TelAviv Activities Inventory, and the results confirmed that this measurement of leisure activities may be useful for career guidance for gifted and talented adolescents. These authors also examined the long-term predictive validity of an earlier version of the Tel-Aviv Activities Inventory. In this longitudinal study, adolescents' creative leisure activities were used as predictors of career choices and accomplishments 18 years later. More than one of three subjects' adolescent leisure activities were related to their later occupation.

Procedures

Both instruments were translated into Hungarian to avoid limiting participation in the study to only English-speaking adolescents. Permission was granted by the principals of the five selected schools to conduct the study.

Statistical procedures. Price Systems prepared individual learning-style profiles for each participant. Raw scores for the 22 learning-style variables were analyzed by SPSS (version 7.5). Univariate analysis of variance was calculated for each learning-style element. Then the data were subjected to discriminant analysis procedures with creativity or achievement as the dependent variable and the LSI subscale scores as the independent variables to determine which learning-style elements significantly discriminated between groups of students by academic achievement or creativity. For each of the elements, the means were calculated, and a stepwise method, Wilks' lambda was utilized. In this analysis, the learning-style element that accounted for the most significant difference between the groups entered the discriminant equation first. Learning-style variables continued to enter the equation until no more learning-style elements were found to discriminate significantly between the creative and noncreative students, or among the groups, according to academic achievement levels.

Results

The study reported results based on the differential achievement levels of the sample. Academic achievement was based on students' end-of-year GPAs, which may have ranged from 1.00 to 5.00 in Hungary, but actually ranged from 2.8 to 5.00 among the participants in this study. The mean GPA was 4.14 (SD=

0.679). Of the 302 students, 293 reported their GPAs on the questionnaires and were assigned to one of the following three groups. (The remaining nine students' scores on the LSI were not entered into the discriminant analysis for achievement only.) High achievers were those who reported GPAs of 4.81 or higher (one standard deviation above the mean), whereas low-achieving students had GPAs of 3.46 or lower (one standard deviation below the mean). All others were labeled average. Table 1 shows the rank order of the learning-style elements that significantly discriminated among the three groups, the number of students in each group, means and standard deviations, and the level of significance. The four elements were self-motivation, responsibility, learning in varied sociological ways, and tactual-perceptual modality preference.

Results for Specific Creative Talents

This study was also designed to identify the learning-style characteristics that discriminated among students who were gifted in the eight domains of creative activity described by Milgram (I989). Table 2 reveals the significant findings, shows the item ratio needed on the Tel Aviv Activities Inventory (Milgram, 1987) to indicate creativity in a specific domain, indicates the ratio of creative versus noncreative students in the sample, gives the stepwise order of discriminant analysis for the learning-style elements that discriminated between creative and noncreative students, and indicates the preference of creative students with a (C). Finally, the significance levels also are noted.

To be classified as creative in science, students had to answer four or more of the eight related items of the Tel Aviv Activities Inventory (Milgram, 1987) positively. The learning-style elements significantly discriminated between the

Table 1

Summary of the discriminant analysis for high-, average-, and low-achieving Hungarian adolescents

Stepwise Order	LSI Element	High Achievers (n=62) M(SD)	Average Achievers (n=170) M(SD)	Low Achievers (n=61) M(SD)	Significance Level (p-value)
1. Motivation		33.69(3.13)	32.00(3.32)	29.52(3.74)	.0001*
2. Responsibility		15.55(2.51)	13.82(2.72)	12.56(3.05)	.0001*
3. Several ways		9.61(4.27)	10.94(3.58)	9.33(3.46)	.0001*
4. Tactual		15.21(4.18)	14.40(4.40)	13.23(4.84)	.0001*

Note. The values represent mean raw scores on the Learning Style Inventory (Dunn, Dunn, & Price, 1996) for each element. *p < .05

196 creative and 106 noncreative students at the $p < .0001$ level were tactual preference and high levels of responsibility, both elements characterizing the creative group.

A total of 225 students were identified to have social leadership talents. They had to answer eight of the eleven inventory items affirmatively. Of the five

Table 2

Summary of the discriminant analysis for creative vs. noncreative Hungarian students in the domains of the Tel Aviv Activities Inventory

Area of Creative Performance	Item Ratio to Reveal Giftedness	Ratio of Creative vs. Noncreative Students	Stepwise Order of LSI Elements	Significance Level (p-value)
Science	4/8	196/106	1.Tactual (C)	.0001*
			2. Responsibility (C)	.0001*
Social Leadership	8/11	225/77	1.Tactual (C)	.007*
			2. Time of Day	.001*
			3. Teacher Motivated(C)	.0001*
			4. Afternoon	.0001*
			5. Light (C)	.0001*
Dance	2/2	58/244	No variable qualified for the analysis.	
Music	4/9	161/141	1. Kinesthetic (C)	.0001*
			2. Teacher Motivated (C)	.0001*
			3. Parent Motivated	.0001*
Art	4/8	133/169	1. Tactual (C)	.0001*
Literature	5/6	79/223	1. Visual	.01*
			2. Teacher motivated (C)	.002*
			3. Parent Motivated	.001*
Drama	2/4	48/254	1. Authority Oriented (C)	.007*
			2. Responsibility (C)	.003*
Sports	4/6	180/122	1. Mobility (C)	.021*
			2. Light (C)	.004*

* $p < .05$.

learning-style elements that discriminated the creative and noncreative students in this domain, tactual modality strength, a need for bright light, and being teacher-motivated characterized the creative group, whereas the noncreative group had strong time-of-day preferences, especially an energy curve in the afternoon.

No variable significantly discriminated between the 58 creative and 244 noncreative students in the domain of dance. The musically creative group (n = 161) — who answered four of nine related questions positively — was characterized by having kinesthetic modality preferences. They were also highly teacher-motivated and needed their teachers' involvement and encouragement in their creative activities. On the other hand, noncreative students (n = 141) appeared to be strongly parent-motivated, seeking their parents' approval and guidance in their noncurricular activities.

Not surprisingly, the single discriminating variable between students with demonstrated talent in the fine arts (n = 133) and their noncreative classmates (n = 169) was the creative groups' affinity for the tactual modality. Learning through manipulating, touching, drawing, illustrating, and writing as opposed to auditory, visual, or kinesthetic approaches was preferred by the artistically talented youngsters.

Those adolescents classified as creative in the domain of literature had to respond to five out of six items positively. The learning-style preferences of the 79 creative students were contrasted with those of the 223 noncreative students. It was found that the creative group was more teacher-motivated, whereas their noncreative peers reported stronger visual preference and parent-motivation.

Positive answers to two of four items were needed to be classified as creative in the area of drama, which yielded groups of 48 creative and 254 noncreative students. The creative group reported themselves to be highly authority-oriented and responsible. Understandably, successfully participating in dramatic productions requires the acceptance of the director's instructions and dependability on behalf of the students.

Finally, four positive answers were needed to qualify as creative in sports. There were 180 in the creative and 122 in the noncreative group. The creative students' need for mobility and bright light were the two elements that significantly discriminated between the two groups.

Discussion

Not surprisingly, high-academic achievers demonstrated significantly higher levels of self-motivation and responsibility than both average and low achievers. They needed less teacher or adult direction and supervision, and more opportunities to participate in self-directed learning tasks, self-designed objectives, and self-paced progress. A student-centered approach would work well with this group of high achievers. Average achievers preferred to learn in a variety of

sociological ways more so than did either high or low achievers. This indicates that the majority of the sample may need opportunities for a variety of learning experiences, including working independently, in pairs, with peers, in larger groups, and with the teacher. High achievers reported the highest tactual-perceptual preference among the three groups, corroborating previous similar findings about the relationship between high academic achievement and tactual preference (Dunn & Griggs, 1995; Jenkins, 1991).

Tactual modality strength indicates learners' ability to best remember information that they have manipulated in some ways. For younger students in certain academic and nonacademic areas, it indicates a strong modality preference for hands-on learning, the use of manipulatives, and experimentation, as opposed to audio-visual methods or whole-body involvement. For specific subject matters and for older students and adults, preferred modes of learning new and difficult information include using their hands for drawing, illustrating, or note taking during lectures or reading assignments. In the context of the Hungarian classroom, however, high-achieving students are probably the most successful in taking well-organized notes of the lectures to which they frequently listen.

Achievement

Students identified as high achievers and/or academically gifted frequently revealed learning-style traits significantly different from those reported by average-, low-, underachieving, or nongifted students (Dunn, Griggs, Milgram, & Price, 1997/1998; Pederson, 1984). Studies conducted in the United States reported that most high achievers or gifted students were self-motivated, persistent students (Gallucci, 1991), who strongly preferred to learn alone or with similar, highly achieving peers in a formal instructional environment with minimum externally imposed structure (Cody, 1983; Dunn & Price, 1980; Ricca, 1983, 1984). In contrast with average- and low-achievers, who typically had a single perceptual-modality strength, gifted students were able to capitalize on multiple perceptual strengths and learn new and difficult information through auditory, visual, tactual, or kinesthetic approaches (Coleman, 1988; Dunn, 1998). Jerkins (1991) found that students with a high GPA preferred tactual instructional resources more than low achievers. Avise (1982), Calvano (1985), and Gallucci (1991) also substantiated that high achievers were responsible or confirming. Gallucci (1991) and Pederson (1984) reported that gifted students functioned best in the later part of the day.

Average students in Pederson's (1984) study needed less mobility than their gifted or learning-disabled classmates. They were peer-oriented and perceived themselves as more responsible than the other two groups. In comparison to gifted junior high school students, Griggs and Price (1980, 1982) found that average achievers had a higher auditory preference and a stronger need to be

motivated by teachers.

Cross-cultural comparisons. These findings were corroborated by several international researchers. Some of the learning-style characteristics of academically able and less able students were found to be consistent across nations. Others appeared to be specific to the cultural group that the study involved.

Persistence and/or responsibility were two traits repeatedly reported by high achievers in Brunei (Pengiran-Jadid, 1998), Canada (Mariash, 1983), Guatemala (Sinatra, Sazo de Mendez, & Price, 1993), Korea (Hong, Milgram, & Perkins, 1995; Suh & Price, 1993), Mexico (Ponce Meza, 1997), and Taiwan (Lo, 1994). High levels of self-motivation were demonstrated by the Mexican gifted sample in two studies (Ingham, Ponce Meza, & Price, 1998; Ponce Meza, 1997). American (Dunn, Griggs, & Price, 1993), Bruneian (Pengiran-Jadid, 1998), Filipino (Ingham & Price, 1993), Israeli (Milgram. & Price, 1993), Korean (Hong, Milgram, & Perkins, 1995), and Singaporean (Yeap, 1987) high achievers also demonstrated high levels of self-motivation. In Israel (Milgram & Price, 1993), the United States (Dunn, Griggs, & Price, 1993), and Northeastern Manitoba (Mariash, 1983), high achievers preferred to learn alone.

Findings unique to cultures included the preferences summarized below. High achievers indicated no need or less need for structure in Mexico (Ponce Meza, 1997), the Philippines (Ingham & Price, 1993), and Guatemala (Sinatra, Sazo de Mendez, & Price, 1993). On the other hand, Taiwanese academically gifted students preferred high levels of structure (Lo, 1994). A formal design was preferred by most of the Cree-Indian gifted sample in Canada (Mariash, 1983), whereas Mexican academically able undergraduates needed an informal learning environment (Ponce Meza, 1997). Singaporean students in the highest achieving course required bright light and quiet (Yeap, 1987). High achievers preferred early and late morning in Korea (Suh & Price, 1993), late morning in Manitoba (Mariash, 1983), and afternoon in Guatemala (Sinatra, Sazo de Mendez, & Price, 1993). American (Dunn, Griggs, & Price, 1993), Guatemalan (Sinatra, Sazo de Mendez, & Price, 1993), and Taiwanese (Lo, 1994) high achievers preferred kinesthetic approaches, whereas the Israeli (Milgram & Price, 1993) and Filipino (Ingham & Price, 1993) group preferred the visual modality. Finally, the Korean gifted sample identified these two approaches (visual and kinesthetic) as their preferred modalities (Suh & Price, 1993).

The findings of this study indicated that a tactual-perceptual preference was one of the learning-style elements that discriminated students of varying academic achievement level as well as creative and noncreative students in the domains of science, social leadership, and art. Hungarian teaching practices, customarily, focus on auditory and visual presentation of academic material. It is possible that this talented group of students inadvertently discovered their own tactual strengths and became potentially able to utilize them by taking good notes during lectures and reading assignments, despite the common Hungarian teaching practices that de-emphasize real-life, hands-on learning and emphasize

lectures. Moving away from the traditional "chalk-and-talk" instructional methods, introducing more hands-on learning experiences in classes outside the science lab and art classes, and utilizing tactual instructional resources may increase students' achievement.

Creativity

Based on cross-cultural comparisons of American, Canadian, Filipino, Guatemalan, Israeli, and Korean creative and noncreative adolescents' learning styles, Milgram, Dunn, and Price (1993) found that, regardless of cultural background, students creative in a particular domain "reported learning styles that were similar to each other's but significantly different from the styles of other creative groups and from the styles of the nongifted" (p. 247). Other investigators conducting research in Brunei (Pengiran-Jadid, 1998), Mexico, and the United States (Ingham et al., 1998; Ponce Meza, 1997) corroborated these findings, as summarized below. For example, students creative in science and art reported tactual-perceptual preferences in Mexico, the United States, Canada, Korea, Guatemala, Israel, and the Philippines. Science-creative youngsters were also characterized by high levels of persistence in Guatemala, Israel, Korea, and the United States; they preferred to learn alone in Israel, Korea, and the United States.

Students with affinity for social leadership reported kinesthetic preferences in Israel, Canada, Guatemala, and the United States. They were also teacher- or parent-motivated, or authority-oriented in the Philippines, Canada, and Israel. Increased intake was needed by sports-oriented students in Mexico, the United States, and Canada. In addition, a strong desire for structure was indicated by American, Korean, and Canadian students with accomplishments in the domain of sports. Students creative in drama were teacher- and/or parent-motivated, often requiring the presence of an authority figure in the United States, Israel, and Guatemala. Similarly, teacher-motivation and/or authority-orientation were characteristics of students creative in dance in Mexico, the United States, Israel, Korea, and Canada. Furthermore, this group reported kinesthetic modality strengths and/or need for mobility in the United States, Guatemala, the Philippines, Korea, and Canada, as well as high levels of self-motivation in Brunei, the Philippines, and the United States. Musically creative American, Filipino, Israeli, and Korean adolescents had apparent environmental needs. Students talented in literature and creative writing also had marked environmental and physiological preferences, including sound, light, intake, and time of day in Canada, Guatemala, Israel, Korea, the Philippines, and the United States. Milgram, Dunn, and Price (1993) also concluded that marked cross-cultural differences were found in the types of creative activities favored in the different nations, which could be attributed to unequal opportunities for creative activity

and uneven access to information and role models.

Compared to the international studies described above, the Hungarian data showed that 11 learning-style elements — (a) visual, (b) tactual, (c) kinesthetic-perceptual preferences, (d) responsibility, (e) time of day, (f) teacher motivation, (g) afternoon preference, (h) bright light, (i) parent motivation, (j) authority orientation, and (k) mobility — differentiated significantly between students who were creative and noncreative in the various domains. Among these elements, tactual-perceptual preference, responsibility, and being teacher-motivated or authority-oriented were recurrent, indicating that these elements deserve distinct attention. The high levels of correlation between giftedness and tactual-perceptional preference have been documented previously across various cultural groups (Dunn & Griggs, 1995); thus, these data corroborated previous findings.

However, the fact that this sample of creative Hungarian adolescents had a strong preference for a learning environment dominated by a teacher or authority figure may be related to cultural factors. Due to political circumstances of the recent past, respect for authority may have been implanted in children from a very young age; understandably, these adolescents have indicated preferences for the presence of an authority figure and the need for the teacher to provide motivation, feedback, guidance, and supervision. In light of these findings, Hungarian teachers need to be aware of the influence they have on the intellectual and creative development of adolescents and make every effort to provide the guidance much needed by this age group.

Conclusions

The purpose of this research was to uncover and analyze the creative talents and learning-style preferences of Hungarian adolescents in order to contribute to the international perspective on learning-style-based research and creativity. The learning-style differences between academically high, average, and low achievers and among students with affinities in eight domains of creativity were described. No two individual learning-style profiles were identical. No two creative or achievement groups of students had the same set of learning-style characteristics. Yet, several trends and patterns were unveiled. Based on the results of this study, it can be concluded that creative versus noncreative and high-, average-, and low-achieving adolescents have significantly different learning-style characteristics. These results supported the findings of several other correlational studies that evidenced significant differences among similar groups of students in various cultural settings in and outside of the United States. The author suspects that the cultural values of family and respect for parents, teachers, authority, and adults in general may have shaped the emotional development of Hungarian youngsters. Accordingly, these have affected the emotional and sociological learning-style preferences of these young people.

Implications For Practice and Future Research

By identifying, understanding, and responding to the unique learning styles of all Hungarian students, educators and parents alike may be able to enhance the students' academic achievement and creative accomplishments in and out of the classroom context. At the same time, raising students' own awareness of their learning-style preferences, teaching them how to capitalize on their strengths and how to cope with instructional approaches that are incongruent with their needs, and helping them develop beneficial study habits and learning strategies may also have a beneficial influence.

Further research could be conducted to determine the similarities and differences of gifted and nongifted students' learning-style preferences in other countries, thus comparing and contrasting the previous findings with the new data. Furthermore, experimental research could also be conducted with students identified as having specific intellectual abilities and/or specific creative talents to reveal the impact of learning-style-based instructional strategies on their general academic achievement and specific achievement in their creative domains.

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Reviewed by Kevin G. Vost, Psy.D., University of Illinois at Springfield, Psychology Program (Adjunct)

International Handbook of Giftedness and Talent (Second Edition), *Kurt A. Heller, Franz J. Monks, Robert Steinberg, and Rona F. Subotnik (Eds.) 2000. Oxford: Elsevier Science Ltd.*

This handbook is truly international, with editors-in-chief from Germany, the Netherlands, and the USA; chapter contributors from every continent (save Antarctica); and chapters addressing gifted programs in Europe, the Middle-East, China, Australia, New Zealand, Latin America, and the USA. Though a "handbook," it is certainly no small manual to be nestled in the palm of one's hand. This second addition boasts 59 chapters totaling 934 pages. Compared to the 1993 first edition, it has 22 more chapters and "80% of the information is new." The book brings readers up to date on giftedness and talent theory, research, and practice from the most gifted and talented social scientists and educators throughout the world. The handbook's seven sections examine changing concepts of giftedness and talent, developmental issues, techniques for identifying giftedness, gifted education programs, counseling issues, examples of international efforts in programs and policies, and thoughts on the future of research and education of the gifted and talented. It is a daunting task to review this cornucopia of knowledge in just a few pages. Nonetheless, let's proceed.

The eight chapters of the first section provide excellent breadth and depth in considering the historically nebulous and contentious theories of giftedness and talent from philosophical, meta-theoretical, historical, and cultural perspectives. In this section, (and in later sections), the nature of giftedness and talent are examined in the light of more recent theories of intelligence and cognitive performance, like Sternberg's triarchic theory, Gardner's multiple intelligences, and models emphasizing acquired expertise as opposed to innate abilities. Still, traditional trait and psychometric approaches, with their rich stockpiles of empirical data, are duly acknowledged. Time and time again, for example, did the authors pay homage to the groundbreaking work of Lewis Terman and his famous "Termites," albeit, in light of current interpretations. Further, comprehensive models specific to giftedness and talent (e.g., the multidimensional "Munich model" and Gagné's "Differentiated Model of Giftedness and Talent") are presented in depth and in the context of empirical research findings. Other highlights from the first section include an explication of Csikszentmihalyi's "flow" theory of creativity, and a chapter undoubtedly of interest to giftedness specialists, that painstakingly examines the changing focus of research, both in terms of academic journals and of presentations at European, Asian, and World conferences. What percentage of papers at world conferences on giftedness, for

example, most specifically address issues of educational psychology, personality psychology, social psychology, developmental psychology, general psychology, or related disciplines? How has this varied across continents and across time? And to what extent are the findings reflected in the top five gifted journals? The answers to these questions and more can be found therein. Indeed, as noted in the handbook's foreword, we are told that this tome not only poses important theoretical and practical questions, but actually answers many.

The 10 chapters of the second section on the development of giftedness and talent are also theoretically substantial, building on the philosophical and historical depth of the first section to address not only the "What is it?" of giftedness and talent, but the "How does it come about?" setting the stage for the practical question, "What can we do about it?" Modern developmental theorists are unlikely to propose dichotomous, mutually exclusive nature vs. nurture theories, to focus on a limited set of variables or constructs, (like intelligence test scores alone), or to attempt to understand one part of the life span, without considering how it is connected to what precedes and follows. This is reflected by chapters on comprehensive models, motivation and cognition, and the life span perspective on giftedness. The second section also looks into the developmentalists' toolbox, with chapters addressing how methods like behavior genetics and longitudinal research contribute to the foundation of our knowledge on giftedness and talent. Special populations, like the exceptionally and profoundly gifted, prodigies, savants, and Williams Syndrome individuals also received detailed treatment in this section.

The four chapters of the third section abound in information of interest to the psychologist and educator as they address various techniques of identifying giftedness and talent. Should a wide or narrow net be cast? When should it be cast? And what kind of net (or nets) should be cast? Traditional psychometric and educational techniques are described and critiqued. Even in the early days of IQ testing though, Russian developmentalist Lev Vygostky proposed that of two children with the same IQ, one child might be much more responsive to guidance or assistance from an adult or more advanced peer in solving more advanced problems, hence, having a broader "zone of proximal development," with burgeoning cognitive skills more ready to bloom. Modern assessment tools based on Vygotsky's theories seek to measure not already mastered cognitive skills, but the degree of responsiveness to assistance. A chapter on the application of these dynamic, "test—learn—test" measures to the identification of gifted populations is among the most thought-provoking contributions to this section.

Review of the 37 chapters of the fourth through sixth sections on "gifted education and programming," "counseling and nurturing giftedness and talent," and "examples of country efforts, polices, programs, and issues" will be collapsed into one paragraph. Though their scope is too vast to do justice in a brief review, be aware that a panoply of issues is addressed, from programs in special

areas like math and the sciences, to the needs of specific groups like girls, underachievers, and students with physical and behavioral disabilities, to a look at special programs in countries and continents including Russia, China, the Middle-East, Australia, New Zealand, Africa, and Latin America.

The last section provides a look at the "present and future of research and education of the gifted and talented." It includes a chapter by editors Stemberg and Subotnik that masterfully integrates a variety of the perspectives enumerated in the book with a hypothetical practical example. It concludes with a comprehensive recapitualition and prospectus "on where we are and where we are going" in the study of giftedness by editors Monks and Heller, with A. Harry Passow.

This book is truly vast in its coverage. As its contributors note, giftedness and talent are many-fold in their manifestations. Topics beyond generalized cognitive horsepower, from the visual arts and music, to creativity and wisdom, lie within its scope. The book also provides gold mines of references to classic and contemporary theory and research. It is also esthetically, as well as intellectually pleasing, abounding in handsomely crafted charts and diagrams.

What are its flaws? The book being a compilation of the latest thought from the most accomplished specialists on earth, this reviewer is hard-pressed to note anything of more substance than the strain its size and weight produced on a recently sprained wrist. One very minor inconsistency was the fact that when Terman's famous longitudinal study of genius was cited by several different contributors, approximately half of them cited the cutoff IQ as 135 and the other half cited the cutoff as 140. Perhaps this was due to different authors referring to different secondary sources, and only a trip to the library and a look at the words of Terman himself would clear this up. Not even this niggling criticism held though. The last chapter resolved this dilemma without the library field trip, as Terman was quoted, telling readers in 1925 that an IQ of 140 was the cutoff for Binet-tested subjects and 135 for high school subjects who had taken the Terman Group Test!

This book is lush in both the forests and the trees of giftedness' global terrain. *The International Handbook of Giftedness and Talent, Second Edition* would make a valuable addition to the library of the general psychologist, educator, or Mensan-at-large interested in a deeper understanding of the state of the art in giftedness theory, research, and applications. It should prove invaluable to the specialists in the field.

Reviewed by Francis Cartier.

The Academic Adventures of Laura Bridges: An Introduction to Educational Architecture Therapy
By James P. Bridges. Bloomington, Indiana: New Philosopher Press, 1999. 170 8 fi by 11 pages. Plastic spiral bound. (New Philosopher Press, 5156 N. Brummetts Crk. Rd, Bloomington IN 47408.)

Laura Bridges is not a real name, nor is James Bridges. He tells us early on that he's using false names "to protect Laura's privacy." So we don't know who they are or if they really exist. I had a problem with that at first, but later found parent Bridges' narrative about his daughter's school experience realistic and even compelling.

This is a narrative of one girl's and her parents' struggle with typical school systems to get an optimum educational experience for a highly gifted child. It wasn't easy. From elementary school until her early admittance to Dartmouth, it called for extraordinary dedication and effort by her parents in bucking educational bureaucracy and policy.

I was frequently reminded of Dr. Irving Lorge's sage comment that "a policy is a preconceived solution to a problem that hasn't come up yet — and the problem seldom comes up exactly as was expected."

Nevermind Mr. Bridges' theory of Educational Architectural Therapy. That may be as it may be. "Laura's" story will be informative, even perhaps inspirational, for any parent with a gifted child attending an ordinary public school.

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